APPENDIX C

Selected Examples of Billeted and Off-Campus Members of the USU Departments, Programs and Activities Receiving Special Recognition During 2002.

Anatomy, Physiology and Genetics - School of Medicine.

Rosemary C. Borke, Vice Chair for Instruction, Professor, USU SOM Department of Anatomy, Physiology and Genetics. Professor Borke's Course, *Clinical Head and Neck and Functional Neuroscience*, has been a perennial favorite of the first-year medical students. In the past year, she has made further improvements by the inclusion of additional educational materials that stress clinical correlations, demonstrating the importance of a firm grounding in basic science. Professor Borke has also produced compact disks (CDs) for instructional purposes in the classroom as well as for home study. A second, interactive CD was distributed to all first-year medical students during 2002. Produced by Doctor Borke and the Class of 2005 SOM student, **Justin Wells**, neuroanatomical images are presented and allow the students to quiz themselves for anatomical identification. The CD also serves as an atlas, where the user can search for images that contain a particular anatomical structure. In May of 2002, Doctor Borke was the co-recipient (with Dean Emeritus Val Hemming) of the prestigious Carol J. Johns, M.D., Medal for Outstanding USU Faculty.

Harvey B. Pollard, M.D., Ph.D., Professor and Chair, USU SOM Department of Anatomy, Physiology and Genetics (APG), has established the USU Center for Medical Genomics and Proteomics in the Department of APG. By his doing so, APG has become one of ten academic organizations in the United States to win substantial support (12.5 million dollars) from the National Institutes of Health (NIH) for the establishment of a Proteomics Center. The NIH contract has allowed the University to acquire a world-class set of mass spectrometers, as well as support personnel, to form the absolutely necessary technical basis for proteomic research in the 21st Century. In terms of NIH funding, this moves APG into the ranks of the top twenty equivalent Departments in United States Medical Schools, and provides this crucial research resource to the entire University; USU researchers will all benefit from this valuable asset. The focus of the Center is on lung disease, with a special focus on the inflammatory flagship genetic disease of cystic fibrosis. One citizen in 20 carries one copy of the mutant gene for cystic fibrosis, and it is the most common autosomal recessive fatal disease in the United States. Information derived from this research promises to impact the understanding of more challenging, but less understood, inflammatory diseases of the lung such as asthma, as well as inflammatory processes in many other parts of the body.

Ignacio Provencio, Ph.D., Assistant Professor, USU SOM Department of Anatomy, Physiology and Genetics (APG); Mark D. Rollag, Ph.D., Professor, USU SOM Department of APG; and, **Maria Castrucci, Ph.D., USU SOM Department of APG,** had their research featured in the journal, Science, during 2002. Our internal daily biological clock ticks with a period of 24 hours and 10 minutes. This means that over time, we will slowly come *out of sync* with the 24-hour solar day. Jet lag is an extreme example of what happens when our daily biological clock is not synchronized to local time.

Light perceived through the eyes is the primary mechanism by which the internal clock is reset. Identification of the photoreceptors in the eye that are responsible for this resetting have remained elusive for the past 20 years. In 2000, Doctors Provencio, Rollag and Castrucci, in collaboration with colleagues in The Scripps Research Institute, the Genomic Institute of the Novartis Research Foundation, and the University of Nijmegen in The Netherlands were able to show that mice lacking melanopsin showed profound deficiencies in their ability to reset their clocks by light. These data indicate that melanopsin-containing cells are likely to be the long-sought photoreceptors. The eye has been extensively studied for over 150 years. The identification of a previously overlooked photoreceptive apparatus within the eye has been recognized as a significant accomplishment. ***This past year, the prestigious journal, Science, recognized the identification and characterization of the melanopsin photoreceptors as one of the Top Ten Scientific Breakthroughs of 2002.***

(*See pages 23, 24, 94, 111, 174, 201, 202, 206, 209, and 210 in the 2002 Edition of the USU Journal for additional information on the Department of Anatomy, Physiology and Genetics*)

Biochemistry and Molecular Biology - School of Medicine.

Peter D'Arpa, Ph.D., Assistant Professor, USU SOM Department of Biochemistry and Molecular Biology, studies *topoisomerase I*, an enzyme that is the molecular target of a widely used class of anti-cancer drugs. His laboratory studies how anti-cancer drugs affect *topoisomerase I* and lead to the elimination of cancer cells. Other research explores the molecular cell biology of *topoisomerase I* and *topoisomerase I-interacting proteins*. The goal of his research is to characterize the cellular functions of *topoisomerase I* and proteins that interact with it to ultimately improve therapies utilizing *topoisomerase I-targeting* anti-cancer drugs. Doctor D'Arpa co-authored the following publications, which were published in peer-reviewed journals during 2002: *Sumoylation of topoisomerase I is involved in its partitioning between nucleoli and nucleoplasm and its clearing from nucleoli in response to camptothecin*, and *Characterization of BTBD1 and BTBD2, two similar BTB-domain-containing kelch-like proteins that interact with Topoisomerase I.* Doctor D'Arpa was also invited to speak at an American Society for Cell Biology conference and presented, *Nontraditional Functions of Ubiquitin and Ubiquitin-like Proteins*, in Colorado Springs, Colorado, during August of 2002. He receives extramural research support from the National Cancer Institute at the National Institutes of Health (NIH).

Saibal Dey, Ph.D., Assistant Professor, USU SOM Department of Biochemistry and Molecular Biology, works on a human protein (P-glycoprotein) found in the cell membranes of cancerous as well as normal cells. This protein removes structurally unrelated hydrophobic compounds from cells by acting as a pump. Since most of the anti-cancer and anti-microbial drugs are hydrophobic in nature, this protein prevents them from reaching their targets. Doctor Dey has been working on the mode of action of this protein and on the molecular mechanism by which this protein can be inactivated using pharmacological agents. The outcome of his study could improve the availability of chemotherapeutic drugs at their site of action and aid in the treatment of cancer and microbial diseases. Doctor Dey and colleagues published: *Functional Characterization of Glycosylation deficient human P-glycoprotein using a vaccinia virus expression system* in the Journal of Membrane Biology, Volume 173, pages 203-214; and, he also wrote a review on *Biricodar* in Current Opinion in Investigational Drugs, Volume 3, pages 818-

823. Doctor Dey was recently awarded a five-year RO1 grant from the National Institutes of Health for his studies on P-glycoprotein.

Teresa M. Dunn, Ph.D., Professor, USU SOM Department of Biochemistry and Molecular Biology, studies complex lipid molecules in yeast that are found in cell membranes. Similar compounds in humans are found in the membranes of the brain and nerves. The human brain has several hundred varieties of these compounds. Several gene products (both enzymes and regulatory proteins) are required to synthesize these complex molecules. The discovery of these genes and their function in producing these molecules in yeast is made possible by genetic methods developed in Doctor Dunn's laboratory. This work will likely suggest what processes in the nerves or brain are affected or regulated by these molecules. Using a powerful genetic screen devised in her laboratory, many of the genes encoding the sphingolipid biosynthetic enzymes have been identified. During 2002, her laboratory published five publications in peer-reviewed journals. A grant to characterize the microsomal fatty acid elongating enzymes was awarded to Doctor Dunn by the National Science Foundation. Doctor Dunn continues to serve as a member of the Metabolic Biochemistry Review Panel for the National Science Foundation.

David A. Grahame, Ph.D., Associate Professor, USU SOM Department of Biochemistry and Molecular Biology, studies metal-containing enzymes in the Archaea, a genetically distinct group of microorganisms that provide insight into the early evolution of life on Earth. Doctor Grahame studies fundamental problems of how metals such as cobalt, iron and nickel function in several highly unusual enzyme systems. These processes are closely related to how cobalt acts in the anti-anemia vitamin B-12, and how iron functions in the body. These studies advance our understanding of metal-containing enzymes in metabolic, ecological, and environmental processes, and contribute to the use of microorganisms for bioremediation, agricultural, and biomedical applications. Doctor Grahame published two articles in peer-reviewed journals during 2002. He presented at the Gordon Research Conference, *Molecular Basis of Microbial One-Carbon Metabolism*, in New London, Connecticut, and also at the Laboratory of Biochemistry, NHLBI, National Institutes of Health. Doctor Grahame receives extramural research support from the Department of Energy and from the National Science Foundation. Recently, Doctor Grahame received research support from the United States Army Soldier and Biological Chemical Command (SBCCOM) for a new project on Biological Threat Agent Simulants.

Susan Haynes, Ph.D., Assistant Professor, USU SOM Department of Biochemistry and Molecular Biology, has identified proteins that regulate the production of gametes (eggs and sperm) in fruit flies. A major cause of human infertility is impaired sperm production. Because sperm develop similarly in flies and humans, these studies in fruit flies could lead to novel treatments to correct human male infertility and to the development of novel pharmacological agents for male contraception. Similarly, the protein that regulates egg production is conserved in humans, and understanding its role could have similar applications to human health. Doctor Haynes published during 2002 in a peer-reviewed journal; she also served as the co-chair of two Washington area regional scientific groups: the RNA Club and the Drosophila Interest Group. She is a member of the Executive Committee of the Molecular and Cell Biology Graduate Program, and serves on the thesis committees for two students in the graduate program. Doctor Haynes presented at the RNA 2002 Meeting held in Madison, Wisconsin, and at the 43rd Annual Drosophila Research Conference in San Diego, California. Her research is funded by an extramural grant from the National Institutes of Health and an intramural grant from USU.

David S. Horowitz, Ph.D., Assistant Professor, USU SOM Department of Biochemistry and Molecular Biology, works on the molecular processes involved in the production of messenger RNA, which carries information from the cell's genes to form the blueprint for the synthesis of cellular proteins. When initially synthesized, the genetic information is encoded in a large linear polymer containing segments of information separated by non-information-bearing segments. Processing the RNA for the protein synthesis machinery of the cell requires the removal of the non-information segments and the joining of the information-containing segments. How the many cellular macromolecules that participate in this fundamental process work together is necessary to understand protein production in cells. Doctor Horowitz published in two peer-reviewed journals during 2002; and, he presented at the Seventh Annual Meeting of the RNA Society in Madison, Wisconsin, and at the meeting held in Banff, Canada. Doctor Horowitz receives extramural research support from the National Institutes of Health.

Paul D. Rick, Ph.D., Professor and Chair, USU SOM Department of Biochemistry and Molecular Biology, directed his long-term research interests at determining the mechanisms involved in the biogenesis and assembly of the outer membrane of Gram-negative bacteria. More specifically, he is interested in defining the genes and enzymes involved in the assembly of enterobacterial common antigen (ECA), a cell-surface glycolipid that is present in the outer membrane of all bacteria belonging to the family, *Enterobacteriaceae* (Gram-negative enteric bacteria). Using a combined genetic and biochemical approach, Doctor Rick has succeeded in defining many of the genes and enzymes involved in ECA assembly. Although the ECA was discovered in 1962, its function has not been defined despite the efforts of many investigators. However, the occurrence of ECA only in Gram-negative enteric bacteria suggests that it serves an important function for these organisms. Indeed, recent data obtained in Doctor Rick's laboratory strongly suggests that it is required for the growth and survival of these organisms in their normal ecological niche; i.e., the gastrointestinal tract of animals and man. Doctor Rick published in the Journal of Bacteriology during 2002; his research is funded by a grant from the National Institutes of Health. Doctor Rick continues to serve on the Editorial Boards of several scientific journals. (*See page 209 in the 2002 Edition of the USU Journal for more information on Doctor Rick.*)

Daniel R. TerBush, Ph.D., Assistant Professor, USU SOM Department of Biochemistry and Molecular Biology, studies exocytosis in yeast. Exocytosis is the process whereby vesicles containing lipid and protein cargo bud off the trans Golgi and are targeted to, and fuse with, the plasma membrane. Exocytosis is highly regulated and exocytic vesicles only fuse at specific, localized domains on the plasma membrane. A multiprotein complex, termed the Exocyst, serves as a specific targeting patch for the exocytic vesicles and is required for their fusion at these specialized domains in yeast and in higher eukaryotes. The research has focused on understanding the role of a protein, Exo70p, in vesicular trafficking. Understanding the biochemical mechanism of how exocytic vesicles are specifically targeted to certain areas will help understand such basic processes as cellular differentiation, neurotransmission, and axon pathfinding. Doctor TerBush's research is funded by the National Science Foundation.

Xin Xiang, Ph.D., Assistant Professor, USU SOM Department of Biochemistry and Molecular Biology, studies how intracellular transport works. Cells move material from areas of assembly to areas of destination like a monorail on intracellular networks composed of protein tubules. A virus that infects a cell can use this pathway to transport its genes to the nucleus. Neuronal function requires movement of material produced in the nucleus to the nerve endings and back. A molecular motor composed of several proteins attaches to the transportable material, and moves it to its destination. The understanding

of which proteins are used to regulate the motor; attach cargo to it; and, transport and release the cargo area could lead to antiviral drugs or enhanced neuronal function. Doctor Xiang published in a peer-reviewed Journal during 2002; his extramural research is funded by the National Science Foundation.

Dermatology - School of Medicine.

Tom Darling, M.D., Ph.D., USU SOM Department of Dermatology, Director of the Sulzberger Laboratory for Dermatologic Research, co-authored the following book chapter in a new dermatology textbook, first presented at the American Academy of Dermatology Meeting in March of 2003: *Application of Molecular Biology to the Study of Skin*, Dermatology, 1st Edition, Harcourt Health Sciences, London, 2003.

Lieutenant Colonel (promotable) Scott A. Norton, Associate Professor, USU SOM Department of Dermatology, has been recognized as an authority on the use of smallpox vaccination. He is working closely with the Centers for Disease Control and the American Academy of Dermatology to develop guidelines for the administration of this vaccine.

Leonard C. Sperling, M.D., COL, MC, USA, Chair, USU SOM Department of Dermatology, has authored a textbook entitled, Atlas of Hair Pathology with Clinical Correlations. This textbook will be available for purchase in March of 2003 and will debut at the American Academy of Dermatology Meeting. The book contains 365 illustrations and is the first comprehensive review of the microscopic pathology of hair disease. It will be published by Parthenon Publications.

(*See pages 93-95 in the 2002 Edition of the USU Journal for additional references to the Department of Dermatology.*)

Family Medicine - School of Medicine.

Department Activities.

The USU SOM Department of Family Medicine hosted two important conferences attended by hundreds of physicians from across the Nation: the week-long 11th Annual Capital Conference Board Review Course was held in June of 2002 at Andrews Air Force Base; and, the three-day Fourth Annual American Society of Sports Medicine Marine Corps Marathon Conference was held at the Virginia Hospital Center.

The Department of Family Medicine's Sports Medicine Fellowship Program headed by **Lieutenant Colonel Francis O'Connor, MC, USA, Associate Professor, USU SOM Department of Family Medicine,** helped to organize and provide medical support for the more than 20,000 participants of the

Annual Marine Corps Marathon held in Washington, D.C., during 2002, as well as the Army 10-Mile Marathon Course.

The Department of Family Medicine continued to sponsor the *Tar Wars* smoking prevention programs at six local elementary schools for hundreds of students. The department uses the skills of its faculty members and the enthusiasm of the USU medical students to deliver this program to the local schools.

Selected Personal Accomplishments.

Simon L. Auster, M.D., Associate Professor, USU SOM Department of Family Medicine, and **Lieutenant Colonel Deborah J. Bostock, USU SOM Department of Family Medicine,** co-authored a 70-page Monograph for the American Academy of Family Physicians on the topic of *Family Violence.* This monograph is used for the education of thousands of physicians across the United States on this critical area of concern.

Captain Nicole Frazer, Ph.D., BSC, USAF, Assistant Professor, USU SOM Department of Family Medicine, had her cutting edge research, *Cardiovascular Reactivity in the Offspring of Hypertensives,* published in Health Psychology. In addition, she was contacted by the *BBC Health Scout News* and *PBS* to provide interviews and a synopsis of her research. Doctor Frazier was nominated by the American Psychological Association for a special achievement award for her work.

Commander Evelyn Lewis, MC, USN, Assistant Professor, USU SOM Department of Family Medicine, was invited to present her research on the psychosocial and cultural barriers to diabetes care at two international conferences in India. She was also invited to present at the American Public Health Association 130th Annual Meeting in Philadelphia on the *Prevalence and Determinants of Disordered Eating Among Military Personnel.* Doctor Lewis was also the sole Uniformed Physician selected by the American Academy of Family Physicians (AAFP) to participate in the AAFP World Congress of Family Doctors.

Lieutenant Colonel Francis G. O'Connor, MC, USA, Associate Professor, USU SOM Department of Family Medicine, was selected as a Board member for the American Medical Athletic Association. In addition, Doctor O'Connor, and the Sports Medicine Fellowship Training Program he directs, also continued to expand the voluntary health care they provide to teams throughout the Washington, D.C. area to include medical support for the Northern Virginia Special Olympics and the teams of Georgetown University, George Mason University, Marymount University, Montgomery College, the United States Naval Academy, American University, and several local high schools. (*See page 211 in the 2002 Edition of the USU Journal for further information on Doctor O'Connor.*)

Lieutenant Colonel Brian V. Reamy, USAF, MC, Associate Professor and Chair, USU SOM Department of Family Medicine, was an invited Speaker to the American Academy of Family Physicians Annual Scientific Assembly on the topic of cholesterol reduction to help prevent heart disease. He was also an invited speaker at the 17th Annual Primary Care Update Conference held in Spokane, Washington, on the increasingly relevant topic of the *Recognition of Bioterrorism in Primary Care.*

Lieutenant Commander Mark B. Stephens, MC, USN, USU SOM Department of Family Medicine, was the First Place winner for his research presentation at the 2002 American Academy of Family Physicians Scientific Assembly entitled, *Physical Fitness: Are Military Kids at Risk?* Doctor Stephens also achieved an additional distinction by successfully passing his certifying specialty examinations in Adolescent Medicine. He was also the co-author with **LTC Francis O'Connor, MC, USA, Associate Professor, USU SOM Department of Family Medicine,** and **Doctor Patricia Deuster, Ph.D., Professor, USU SOM Department of Military and Emergency Medicine,** of a Monograph on Exercise and Nutrition for the American Academy of Family Physicians.

Colonel William Sykora, USAF, MC, Assistant Professor, USU SOM Department of Family Medicine, was invited to present his research on curricular innovations in Family Medicine Education at the Annual Society of Teachers of Family Medicine Annual Meeting.

CAPT Cynthia Williams, D.O., USN, Assistant Professor, USU SOM Department of Family Medicine, was selected to be the Specialty Leader in Family Medicine for the United States Navy Surgeon General. In this role, she serves as the principal adviser on all matters related to Family Medicine in the United States Navy. She also authored an article in the journal, American Family Physician, on *Using Medications Appropriately in Older Adults.*

Cindy C. Wilson, Ph.D., C.H.E.S., Professor, USU SOM Department of Family Medicine, coordinated 12 Faculty Development Grand Rounds for military and civilian attendees from 19 different USU SOM Departments and four local military institutions.

Laboratory Animal Medicine.

Lieutenant Colonel (P) James R. Swearengen, Director, USU Laboratory Animal Medicine, was an invited speaker at the **USA-Russia Workshop on International Research Ethics, Institutional Review Boards and Laboratory Animal Welfare** held at the Shemyakin and Ovchinnikov Institute of Bioorganic Chemistry in Pushchino, Russia. This workshop was held during January 20-24, 2002, and was sponsored by the Biotechnology Engagement Program of the Department of Health and Human Services. Doctor Swearengen was invited by the Department of Health and Human Services to present three lectures that included: 1) *The International Animal Research Community, Resources and Considerations*; 2) *Ending the Confusion of Animal Research Requirements, DoD Policy, PHS Animal Welfare Assurances, AAALAC Accreditation, and Good Laboratory Practices (GLP)*; and, 3) a *Panel Discussion on Physical Plant Requirements for DoD-Sponsored Animal Research.* Lectures were presented by both United States and Russian experts in the areas of human and animal use in research to

help establish a common ground for collaborative research efforts. The workshop was attended by 80 Russian participants from over 30 different institutes.

Medical History - School of Medicine.

Dale C. Smith, Ph.D., Professor and Chair, USU SOM Department of Medical History, participated in strategic discussions at the University of Birmingham (England). The University of Birmingham is planning to establish an MSc Degree for the British Forces in the History of Military Medicine that will be patterned on the USU Masters of Military History. (*See page 76 in the 2002 Edition of the USU Journal for further information on Doctor Smith.*)

Medical and Clinical Psychology - School of Medicine.

Martha Faraday, Ph.D., Assistant Professor, USU SOM Department of Medical and Clinical Psychology, was the recipient of the Ove Ferno Award for Innovative Research, which is given by the Society for Research on Nicotine and Tobacco. The award is intended to support innovative ideas in nicotine and tobacco research. In particular, the award is designed to attract "high risk/high impact" proposals that might lead to large changes in nicotine and tobacco research or intervention. The award consists of $25,000 per year for two years. Doctor Faraday won the award for a proposal to examine the putative anti-depressant properties of nicotine in an animal model of stress- and depression-sensitive female rats and stress and depression-resistant female rats. This work is relevant to understanding smoking-depression comorbidity that has been documented in humans.

Neil E. Grunberg, Ph.D., Professor, USU SOM Department of Medical and Clinical Psychology, spearheaded efforts to establish a relationship between USU and the National Rehabilitation Hospital (NRH) for training, research, and communication; and, Doctor Grunberg serves as the USU liaison with the NRH. This relationship has already allowed: USU medical students to obtain valuable training in head injury and Neurology; NRH neuropsychologists to train at USU; and, resulted in a USU/NRH collaborative research project on recovery from polio. Doctor Grunberg was also appointed as a Member of the National Institutes of Health Study Section on Brain Disorders and Clinical Neuroscience (BDCN-6) Review Committee, Center for Scientific Review, National Institutes of Health.

Willem J. Kop, Ph.D., Assistant Professor, USU SOM Department of Medical and Clinical Psychology, was awarded the Annual Award for Outstanding Contributions to Health Psychology from the American Psychological Association Division of Health Psychology for his contributions to knowledge in behavioral cardiology. Doctor Kop's investigations suggest important pathways by which mental stress may act as a trigger for heart attack and sudden cardiac death in vulnerable patients. This work has also set the stage for a promising new research area, examining relationships among psychosocial factors, immune system parameters, and cardiovascular disease progression.

Kelly Rohan, Ph.D., Assistant Professor, USU SOM Department of Medical and Clinical Psychology, received a Behavioral Science Track Award for Rapid Transition (B/START) from the National Institute of Mental Health. Since she joined USU in 2000, Doctor Rohan has been seeking to develop novel treatments for seasonal affective disorder (SAD) - Major Depression with onset in the Fall/Winter and remission in the Spring/Summer. This grant will allow Doctor Rohan to conduct a randomized clinical trial comparing a SAD-tailored group cognitive-behavioral psychotherapy, light therapy, and their combination relative to a minimal contact/delayed treatment control for SAD.

Richard Tanenbaum, Ph.D., Assistant Professor, USU SOM Department of Medical and Clinical Psychology, and **Commander Evelyn Lewis, MC, USN, Assistant Professor, USU SOM Department of Family Medicine,** are the co-directors of the USU Center for Enhancement of Healthcare Training Outcomes (CEHTO). CEHTO is a collaborative effort between the two USU SOM Departments of Family Medicine and Medical and Clinical Psychology. It is a biopsychosocial training program for medical students and residents, nursing students, clinical/medical psychologists, prospective health care professionals, and faculty. CEHTO infuses concepts and processes into existing curricula and uses the National Capital Area Medical Simulation Center to provide opportunities for students to practice new skills with standardized patients and to improve cultural proficiency and professionalism. The program's aim is to improve health care provider-patient relationships, increase patient satisfaction, improve adherence, and maximize health care outcomes. During the past year, **Ms. Kimberly Rattley** was hired as a new half-time Associate Director/Program Development.

(See page 317 in the 2002 Edition of the USU Journal for additional information on departmental activities.)

Medicine - School of Medicine.

Colonel Naomi E. Aronson, MC, USA, Associate Professor and Director, Division of Infectious Diseases, USU SOM Department of Medicine, successfully competed for the Pfizer Visiting Professorship in Infectious Diseases to bring Doctor Anthony Bryceson from the London School for Tropical Medicine and Hygiene, to USU during April of 2002. COL Aronson was also selected to serve as the Chair of the Institutional Review Board for the Sequelae Global Tuberculosis Foundation. Her scientific works were published in a variety of journals including Nature Medicine and Clinical Infectious Diseases. She was invited to write a book chapter on Botulism and to speak at the 51st Annual Meeting of the American Society of Tropical Medicine and Hygiene. COL Aronson also serves as advisor to the Surgeon General of the Army for Leishmania Policy for the military returning from the Southwest Asia theatre.

Colonel Stephen Brietzke, USAF, MC, Assistant Professor of Medicine, gave a presentation at the 4th Annual National Veterans Affairs (VA) Conference on Diabetes Mellitus, on the topic, *Angiotensin Converting Enzyme Inhibitors and Angiotensin Receptor Blockers in Diabetes Mellitus.* Additionally, he presented the *ABC's of Diabetic Complications* at a live satellite continuing education broadcast for physicians, nurses, and allied health specialists. The program was broadcast world-wide to all VA and DoD facilities.

Major Victor Bernet, MC, USA, Assistant Professor of Medicine, serves as Acting Chairman of the Public Health Committee for the American Thyroid Association; and, he has been elected President of the Society of Uniformed Endocrinologists.

Colonel Henry Burch, MC, USA, Associate Professor of Medicine and Director, Division of Endocrinology, has served as the Guest Editor for the upcoming Endocrinology and Metabolism Clinics of North America issue entitled, *Consultative Endocrinology*. He has also published several articles this year in JAMA and Archives of Internal Medicine.

Louis Cantilena, M.D., Ph.D., Professor of Medicine and Director, Division of Clinical Pharmacology, was elected President of the Association of Clinical Pharmacology Units (ACPU), an international organization of clinical research professionals who primarily conduct early phase human drug studies. He also chairs the Non-Prescription Drug Advisory Committee for the Food and Drug Administration. Doctor Cantilena is a reviewer for the Internet Journal of Medical Toxicology; and, he was selected to be a member of the Patient Safety Subcommittee of the American College of Medical Toxicology.

Captain Chad DeMott, USAF, MC, has prepared two Case Reports for presentation at the next Annual Meeting of the Society of Air Force Physicians. He is also working on a project (in collaboration with Doctor Louis Pangaro) regarding student performance on the National Board of Medical Examiners (NBME) examination.

Commander Gerald Dodd Denton, MC, USN, Assistant Professor of Medicine, coordinated the expansion and transition, from paper to CD-ROM, of the ambulatory reading packet for the third-year clerkship students. He re-instituted the journal club for internal medicine house staff at the National Naval Medical Center (NNMC); and, Doctor Denton instituted and taught the small group Epidemiology for Internists Course at NNMC.

Sonia Doi, Ph.D., Research Associate Professor of Medicine, was a Guest Lecturer at the University of Brazil (Graduate Program, School of Pharmaceutical Sciences), Sao Paulo. Her lectures focused on *Protein Synthesis and Applications* and *Effect of Glutamine Supplementation on Kidney Cells*. Additionally, Doctor Doi was a featured guest and spoke on *Protein and Amino Acids Supplementation: Possible Risks* at a conference organized by the Brazilian Society of Nutrition.

Colonel William Duncan, MC, USA, Professor of Medicine, has been elected Chairman, Board of Directors, of the Washington Bone Club.

Major Steven Durning, USAF, MC, Assistant Professor of Medicine, was promoted to Fellow, American College of Physicians; received the Meritorious Service Medal from the Command at the Wright-Patterson Air Force Base; and, was selected to be a member of the Evaluation and Research

Committee of the Clerkship Directors of Internal Medicine. Major Durning is a popular speaker at state and national meetings of medical educators as well as clinicians. He recently published articles on medical resident performance on ABIM certifying examinations in Military Medicine and in Academic Medicine. Additionally, Major Durning published articles on thyroid cancer in Thyroid and Clinical Infectious Diseases; and, he was also invited to submit manuscripts for Medical Education on the educational value of humanitarian assistance missions in internal medicine training.

Colonel Arn Eliasson, MC, USA, Associate Professor of Medicine and Director, Division of Pulmonary Medicine, has written in various publications such as Chest and the American Journal of Respiratory Critical Care Medicine. He also serves as reviewer for those journals and is a member of the National Heart, Lung, and Blood Advisory Council of the National Institutes of Health (NIH).

Margaret Gaglione, M.D., Assistant Professor of Medicine, submitted a paper, *Assessment of Patient Management Skills and Clinical Skills of Practicing Physicians Using Computer-Based Case Simulations and Standardized Patients*, which was accepted for publication in Medical Education. Her paper entitled, *Role Modeling*, has been accepted for publication in Academic Medicine.

Lieutenant Colonel William Gilliland, MC, USA, Associate Professor of Medicine, serves as reviewer for three peer-reviewed journals: Annals of Rheumatic Diseases; Clinical and Experimental Rheumatology; and, the Journal of Clinical Rheumatology. He has published four articles in Military Medicine, Arthritis Rheumatism, and Clinical Immunology; and, he has written three chapters for a rheumatology textbook, Rheumatology Secrets. Doctor Gilliland was awarded the prestigious Army "A" Proficiency Designator in 2002.

Robert E. Goldstein, M.D., Professor and Chair, Department of Medicine, was inducted to Mastership in the American College of Physicians - American Society of Internal Medicine. Doctor Goldstein was a Visiting Professor at the Tripler Army Medical Center in Honolulu, Hawaii, where he made a presentation on rheumatic heart disease, participated in a teleconference with the Royal Thai Military Hospital on the subject of dengue fever, and gave a cardiology conference for housestaff. Doctor Goldstein continues to review frequently for the Annals of Internal Medicine, JAMA and multiple cardiology journals. In 2002, he also served as Chair, Board of Academic Councilors of the Henry M. Jackson Foundation.

Mark Haigney, M.D., Associate Professor of Medicine and Director, Division of Cardiology, has published in the American Journal of Cardiology, Cardiovascular Research, and the Journal of Cardiovascular Electrophysiology. He currently has a paper in press with the Annals of the New York Academy of Science. He serves on the National Institutes of Health (NIH) NCCAM Study Section, and the NIH Office of Pharmacologic and Alternative Therapies, Center for Substance Abuse Treatment. In addition, Doctor Haigney is a consultant to the Food and Drug Administration (FDA) Center for Devices and Radiological Health Committee on New Devices for the Treatment of Congestive Heart Failure.

Lieutenant Colonel Paul Hemmer, USAF, MC, Assistant Professor of Medicine, was awarded the Master in Public Health Degree from USU. Doctor Hemmer's research in the field of medical education, specifically student evaluation, assessment, and professionalism, has been well received in numerous poster presentations, lectures and publications such as Teaching and Learning in Medicine and Academic Medicine. Additionally, Doctor Hemmer serves as reviewer for Academic Medicine and for the Annual Research in Medical Education Conference, Group on Educational Affairs, Association of American Medical Colleges (AAMC). Doctor Hemmer was a featured speaker at the 5th Annual CDIM Review of Medical Education Conference, presented Medical Rounds at SUNY Upstate Medical Campus, and presented at several workshops including the Association for Medical Education in Europe, the Clerkship Directors in Internal Medicine, and the American College of Physicians, Army Chapter. He continues to serve as the Treasurer of the Clerkship Directors in Internal Medicine organization.

Przemyslaw Hirszel, M.D., Professor of Medicine, Director, Division of Nephrology, continues to serve as a valued member of the Department of Medicine's Executive Committee and as a mentor to junior faculty members, whom he guides in their research endeavors. He also served on several University and School of Medicine committees, including the position of Chair for the Search Committee for the new Department Chair in Biochemistry and Molecular Biology.

Lieutenant Colonel Jeffrey Jackson, MC, USA, Associate Professor of Medicine and Director, Division of General Internal Medicine, served as Program Chair for the Society of General Internal Medicine's 2002 National Meeting; he was also appointed to serve as Chair for the Communications Committee, Society of General Internal Medicine. He served as Chair of an *ad hoc* committee to investigate the launch of a new journal for the Society of General Internal Medicine; and, he was appointed to serve as Chair, Workshops Selection Committee, Mid-Atlantic Regional Meeting, for the Society of General Internal Medicine. Doctor Jackson has successfully mentored several Fellows in the General Internal Medicine Fellowship Program; and, he has presented papers and posters at several scientific programs. He is a prolific writer with eleven publications during 2002, and nine papers currently in review in the fields of medical outcomes, patient satisfaction, faculty development and alternative health practices. His papers have been published in the American Journal of Medicine, the Annals of Internal Medicine, the Archives of Internal Medicine, and JAMA. Significantly, his papers were selected by the Journal of General Internal Medicine as among their best, with one in the top ten articles published by that journal; and, one of his papers was selected as the best review article during 2002. His mentored project was a finalist for the 2002 Hamolsky Award by the Society of General Internal Medicine. He was an invited speaker at: Grand Rounds at the Tripler Army Medical Center in Honolulu, Hawaii; the International Regenstrief Symposium; the National Meeting of Social Security Administrators; and, the American College of Chest Physicians.

Lieutenant Colonel Lisa Moores, MC, USA, Associate Professor of Medicine, successfully developed a new Medicine Clerkship Web Site for use by students and faculty. Additionally, she developed a Clerkship CD-ROM with all of the clerkship information, forms, site information, and educational resources. Doctor Moores also developed a CD-ROM with 60 full text core reading articles for use in ambulatory medicine. She has presented extensively at national CDIM meetings. Highly regarded by students for her teaching skills, Doctor Moores is often named *Most Valuable Teacher* by students during their clerkship rotations. She assumed the responsibility of Chair of the Affiliate Network and is a member of the Credentials Committee of the American College of Chest Physicians (ACCP).

Doctor Moores co-founded *CHEST Challenge*, a competition for Pulmonary and Critical Care Medicine Fellows in the United States and Canada. She served on the scientific program for the CHEST 2002 Annual Meeting and is the Chair of a new post-graduate course to be given in conjunction with the ACCP Annual Meeting. She has published two abstracts and submitted three manuscripts for publication. Doctor Moores serves as a reviewer for two American and one European respiratory journals.

Louis Pangaro, M.D., Professor of Medicine, Vice Chair, Educational Programs, serves on the Research Advisory Committee of Academic Medicine and on the Internal Research Review Committee, National Board of Medical Examiners. He also serves as the Co-Director, Course for Residency and Fellowships Program Directors, for the National Capital Consortium; and, he is a member of the Research in Education Committee of the GEA/AAMC. He is highly sought after on the evaluation of students, having presented at various medical schools in North America and the National Board of Medical Examiners. In addition, he has lectured to clerkship directors at the annual CDIM meeting as well as to staff at USU's affiliated hospitals. Doctor Pangaro presented at several workshops, including the Association for Medical Education in Europe. He has written numerous publications this year for Academic Medicine, CDIM News, and Teach and Learn Medicine.

Matthew Pollack, M.D., Professor of Medicine and Director, Division of Infectious Diseases, published extensively in the fields of bacterial diseases, P. aeruginosa, endotoxin, sepsis, hemorrhagic shock and cytokines. His research in cytokines and hemorrhagic shock has significant implications for military medicine since shock continues to be one of the most common and serious consequences of battlefield injury and one of the most frequent causes of death.

CAPT Kevin Porter, MC, USN, Associate Professor of Medicine, has established a new Dengue Fever Vaccine Laboratory within the Department of Medicine and has contributed significantly to the literature in this field in the Journal of Medical Virology. Doctor Porter was awarded a patent for *Dengue Nucleic Acid Vaccines that Induce Neutralizing Antibodies* and lectures widely on this topic of military significance.

Lieutenant Colonel Michael Roy, MC, USA, Associate Professor of Medicine and Director, Division of Military Internal Medicine, has had his work in the area of operational medicine and humanitarian assistance published in the Special Operations Forces Medical Handbook and Military Medicine. He has presented poster sessions and lectured extensively on these subjects at conferences and grand rounds. Additionally, he presented on his study of *DEET and Permethrin Under Stress Conditions* at the Annual Meeting of the Army American College of Physicians, American Society of Internal Medicine Meeting; and, he presented on the subject of *Bioterrorism - What Every Internist Should Know* at the DC Chapter, Scientific Meeting, ACP-ASIM. Doctor Roy chaired the USU 16th Annual Conference on Military Medicine bringing together the medical educational leadership of the Office of the Assistant Secretary of Defense (Health Affairs) and of the Army, Navy, and Air Force to develop a strategy for teaching military medicine at all levels. (*See page 12 of the 2002 Edition of the USU Journal for more information on the 16th Annual Conference on Military Medicine.*) He has also been involved in developing training materials for a military medical response to bioterrorism.

Donald Sellitti, Ph.D., Research Associate Professor of Medicine, received a Certificate of Recognition from the USU SOM Department of Anatomy, Physiology and Genetics for his "outstanding contribution to its teaching program." Doctor Sellitti continues to serve as a peer reviewer for articles in the field of endocrinology and metabolism.

Lieutenant Commander John Tourtelot, MC, USN, serves as an Advisory Member of the Board of Directors for the American Association of Clinical Endocrinologists.

Colonel George Tsokos, MC, USA, Professor of Medicine, Vice Chair for Research Programs, and Director, Division of Immunology and Rheumatology, is well known in his field of expertise. He continues to serve as a member of the NIH Immunological Sciences Study Section; and, he was elected Councilor/President for 2001-2006 of the Clinical Immunology Society. Doctor Tsokos is also a member of: the Board of Directors of the Lupus Foundation of America; the Arthritis Foundation Immunology Study Section; and, the Abstract Selection Committee, National American College of Rheumatology. Colonel Tsokos serves as editor, or guest editor, of numerous publications such as International Reviews in Immunology, Trends in Molecular Medicine, Journal of Immunology, Clinical and Diagnostic Laboratory Immunology, Lupus, Journal of Investigative Medicine,and Clinical Immunology. He is the Chair of the Editorial Board of Lupus News; and, he is the Editor-in-Chief of Modern Therapeutics in Rheumatic Diseases. Doctor Tsokos has contributed chapters in several books. He is a much sought after speaker on the topic of Lupus and other immunological diseases and currently holds three NIH RO1 grants and one grant from the Medical Research Materiel Command.

Colonel Robert Vigersky, MC, USA, Associate Professor of Medicine, serves as the Endocrine Society Representative to the American Medical Association.

Captain Alan Wimmer, USAF, MC, Assistant Professor of Medicine, recently published an article in the Journal of Interventional Cardiac Electrophysiology; and, he presented at the 10th Ottawa Conference on Medical Education, at the Annual Meeting of Air Force Physicians.

Colonel Roy K.H. Wong, MC, USA, Professor of Medicine and Director, Division of Gastroenterology, was elected to the Organisation Mondiale d'Etudes Specialiseees sur les Maladies de Oesophage (OESO). Doctor Wong conducts ongoing research with several grants from professional societies and the NIH. He is an active leader and serves in many professional societies as: the Chair of the Board of Governors of the American College of Gastroenterology; the Chairman, Abstracts Selection Committee, ASGE/DDW; the Chairman of the Credentials Committee for the ACG; and, a member of the Permanent Scientific, OESO. Colonel Wong has presented numerous scientific papers and has published articles on the topics of colonic Neoplasia, achalasia, Barrett's Esophagus, and other diseases of the gastrointestinal tract. These articles appeared in peer-reviewed journals such as: Gastroenterology; Gastrointestinal Endoscopy; and, Gastrointestinal Endoscopy Clinics of North America. Doctor Wong is a much sought after reviewer by national and international publications on a variety of gastrointestinal illnesses.

(See Pages 93, 111, and 207 in the 2002 Edition of the USU Journal for additional information on the Department of Medicine.)

Microbiology and Immunology - School of Medicine.

Submission from the Department of Microbiology and Immunology immediately follows page 40.

Military and Emergency Medicine - School of Medicine.

(See Section I, Military Unique Curriculum, pages 155, 156, 158, 165, 168, 169, and, 170; and, Section IV, Graduate Education Programs, pages 317 and 318 of the USU Journal for information on the Department of Military and Emergency Medicine.)

Neurology - School of Medicine.

Department Activities: The Department of Neurology has oversight for three Congressionally mandated programs:

The Defense Brain and Spinal Cord Injury Program. This program, established in 1992, continues to provide care and research for patients with brain and spinal cord injury throughout the DoD and VA hospitals. Funding has been received for the program in 2003 in the amount of $10 million.

The Post-Polio Syndrome Program. Established in 2000, this program provides patient care and research in the area of Post-Polio Syndrome (PPS). A large multi-center protocol began during 2002, to include the following collaborators: USU; the Conemaugh Health Program in Johnstown, Pennsylvania; the Walter Reed Army Medical Center; the National Institutes of Health; and, the National Rehabilitation Center. This protocol investigates the cause of PPS and researches treatment effectiveness against symptoms; additional treatment and investigative protocols are being developed. Funding has been received for the program in 2003 in the amount of $3.2 million.

The Neuroscience Program. This program was established during 2001; it investigates the cause and researches preventive and treatment options for neurological patients suffering from stroke, spinal column issues, headaches, epilepsy, and pain. The collaborative institutions include: USU; the Conemaugh Health Program in Johnstown, Pennsylvania; the National Naval Medical Center (NNMC); and, the Walter Reed Army Medical Center. Ongoing protocols focus on headache and stroke. Future protocols are being developed for studying epilepsy, spine problems, and pain. The Navy plains to establish a Spine Center at the NNMC. Funding received for the program for 2003 was $5.4 million.

Individual Contributions.

COL Bahman Jabbari, MC, USA, Professor and Chair, USU SOM Department of Neurology, presented the Department of Defense's Epilepsy Medical and Surgical Program results for the past 20 years during a lecture at the University of Bologna, Italy. Doctor Jabbari and colleagues presented the paper, *Spinal Cord Metastasis from Breast Cancer*, at the annual meeting of the American Academy of Neurology; and COL Jabbari and colleagues also published the paper, *Efficacy of Botulinum Toxin A in Chronic Low Back Pain*, in Neurology (2001: Volume 56, Pages 1290-1293). The American Academy of Neurology designated this study, which received press coverage on *CNN*, *Canadian Television*, and Time magazine, as being of significant public interest. Colonel Jabbari also established a Clinical Neuroscience Center. The Center has board certified specialists (Neurology, Sleep Medicine), generalist physicians, registered nurses, and data collection personnel. The Center also houses state-of-the-art EEG, EP, Sleep and Epilepsy Monitoring Equipment. The Center has been established to support the Department's Congressionally mandated programs (spinal cord injury, stroke, headache, epilepsy, pain, and post-polio syndrome research). In addition, Colonel Jabbari participated in the United States-Neurotoxin Institute Meeting as an advisor during December of 2002, in San Juan, Puerto Rico.

Lieutenant Colonel Geoffrey Ling, MC, USA, Professor, USU SOM Department of Neurology, was appointed to the National Institutes of Health's PULSE (Post-Resuscitation and Utility of Life Saving Measures) Committee. He was also named Chair of the PULSE Subcommittee on Central Nervous System Trauma. Doctor Ling was the senior author and co-author on three papers: *Quantitative Model of Intracerebral Hemmorrhage*, Critical Care Medicine (2001: Volume 29, Pages 152-158); *Rituximab Using a Thrice-Daily Weekly Dosing Schedule in B-Cell Chronic Lymphocytic Leukemia and Small Lymphocytic Lymphoma Demonstrates Significant Clinical Activity*, Clinical Oncology (2001: Volume 19, Pages 2153-2164); and, *Absence of Early Proinflammatory Cytokine Expression in Experimental Intracerebral Hemorrhage*, Neurosurgery, (2001: Volume 49, Pages 416-421). Doctor Ling has been the organizer of the first Brain Injury Symposium held at USU on June 3, 2002; and, he has been the guest speaker and expert advisor at five major military meetings, to include one held in Russia, during 2002.

Ann M. Marini, M.D., Ph.D., Associate Professor, USU SOM Department of Neurology, spoke on the issue of neuroprotection at the 5th International Congress on Amino Acids and Analogues in Vienna, Austria. Her Published papers include: *Synaptic Deprivation and Age-Related Vulnerability to Hypoxic-Ischemic Neuronal Damage*, Annals of the New York Academy of Sciences, (2001: Volume 939, Pages 238-253); and, *NF-kB Is a Critical Determinant for NMDA Receptor-Mediated Neuroprotection*, Neurochemistry, (2002: Volume 78, Pages 254-264). Another military relevant paper, *Cyclooxygenase-2 inhibition protects cultured cerebellar granule neurons from glutamate-mediated cell death*, was also published by Doctor Marini in the May 2002 issue of Neurotrauma.

Ajay Verma, M.D., Ph.D., Associate Professor, USU SOM Department of Neurology, published two papers: *Low Tech Neuroprotection for Brain Injury*, Head Trauma Rehabilitation, (2001: Volume 16, Pages 206-209); and *Erythropoietin and Erythropoietin Receptor Expression in Human Cancer*, Cancer Research, (2001: Volume 61, Pages 3561-3565). Another military relevant paper by

Doctor Verma was published in the September 2002 issue of Cancer, *Immunohistochemical expression of erythropoietin and erythropoietin receptor in breast carcinoma.*

Obstetrics and Gynecology - School of Medicine.

William H.J. Haffner, M.D., CAPT, USPHS (Retired), Professor and Chair, USU SOM Department of Obstetrics and Gynecology, received the Distinguished Service Award from the American College of Obstetricians and Gynecologists (ACOG) at its Annual Clinical Meeting in Los Angeles, California, on May 8, 2002. The ACOG Distinguished Service Award was created in 1968 and is presented to outstanding individuals in Obstetrics and Gynecology who have made significant contributions within ACOG, in government, in research, in teaching, or in direct patient care. Doctor Haffner maintains his clinical practice at the National Naval Medical Center. He began his Public Health Service career with the Indian Health Service (IHS) in 1971, when he served in leadership roles in the Department of Obstetrics and Gynecology in Gallup, New Mexico. He served as Obstetrics and Gynecology Consultant for the IHS until 1994. Doctor Haffner was transferred to the National Capital Area in 1981 and has served in a variety of consultative roles, to include Chief Professional Officer, Medical Category, United States Public Health Service, a position he held for four years. Doctor Haffner received the ACOG/Wyeth-Ayerst President's Community Service Award in 1994. He is active in the Armed Forces District; and, he has served, or is currently serving, on several ACOG committees, including the Committee on American Indian Affairs, the Committee on Practice Bulletins - Gynecology, and the Committee on Health Care for Underserved Women. Doctor Haffner is currently the Secretary-Treasurer-elect of the Association of Professors of Gynecology and Obstetrics.

Lieutenant Colonel Andrew J. Satin, USAF, MC, Professor and Vice Chair, USU SOM Department of Obstetrics and Gynecology, USU SOM Class of 1984, continued to serve the University, the National Naval Medical Center, and the Walter Reed Army Medical Center with extraordinary leadership and expertise in 2002. During the past four years, he has been the Program Director of the Uniformed Services Residency in Obstetrics and Gynecology at the National Capital Consortium; he has taken this new program from Provisional Accreditation status to Full Accreditation for the maximum possible length of five years. Only eight programs in the United States have earned five-year accreditation and none have catapulted from provisional to five-year accreditation in only a single step. In addition to his duties at the University, Doctor Satin is a member of the Editorial Board of Obstetrics and Gynecology, the most prestigious journal in the specialty. He is certified by the American Board of Obstetrics and Gynecology and its sub-specialty division of Maternal-Fetal Medicine; and, he is an oral examiner for the American Board.

Pathology - School of Medicine.

Colonel Richard M. Conran, MC, USA, Professor, USU SOM Department of Pathology, is a consulting Pathologist to the National Naval Medical Center (NNMC) and the Department of Pediatric Pathology at the Armed Forces Institute of Pathology (AFIP). Doctor Conran is the Course Director for the Pathology MSII Course; and, he serves as an Instructor in the Pathology Laboratory Course and the Pathology MSII Small Group Case Studies. As part of his collaborative efforts, he is a Lecturer in the

EID Graduate Education Program on *Fundamentals of Infectious Diseases*; and, he is a Lecturer in BioChemistry on *Clinical Correlation in Histology*. Doctor Conran is a Co-Investigator on DNA Identification Protocols at AFIP.

Sara Contente, Ph.D., Research Assistant Professor, USU SOM Department of Pathology, is a member of the IACUC Committee; she is currently working on the mechanism of action of an important tumor suppressor gene. This work has received wide and favorable notoriety. As a part of her collaborative efforts, Doctor Contente serves as a Lecturer on *Techniques in Cellular and Molecular Biology* (MCB0801) and *Nucleic Acid Probes and Hybridization and DNA Sequencing and Transfection.*

Mary Lou Cutler, Ph.D., Associate Professor, USU SOM Department of Pathology, taught courses for the Molecular and Cell Biology (MCB) and Pathology Graduate Education Programs. She is a member of the USU Merit Review Committee and the USU Biohazard Committee. In addition, she is the co-director of the MCB Cell Biology Courses for graduate students. Her research program focuses on the regulation of mammary epithelial cell differentiation. In particular, she is interested in the mechanism by which activation of the Ras pathway disrupts mammary epithelial differentiation. The Ras pathway is frequently activated by signaling from the ErbB receptors in breast tumors, and activation of this pathway is characteristic of more aggressive tumors. Doctor Cutler and her staff are interested in determining which of the effector pathways activated by Ras is responsible for the block in differentiation. Her recent findings have demonstrated that activation of the Raf-Mek-Erk signal transduction pathway by the epidermal growth factor family of mitogenic peptides results in the inhibition of mammary differentiation by inhibiting Stat5, an obligate transcription factor for the expression of genes involved in lactogenesis. In addition, the activation of the Ras pathway prevents the normal down-regulation of the expression of Mek-1 and other kinases and scaffolding proteins that constitute the Raf-Mek-Erk signaling complex. The research in her laboratory is currently supported by two grants. In addition to the graduate students, there are two post-doctoral fellows and a technician working in her laboratory. The laboratory has published one paper and has submitted three manuscripts for publication in the last six months. Doctor Cutler was in the process of preparing three grant applications for submission in May and June of 2003, to include a new NIH Ro1 application. Her duties as the Associate Director for Basic Science of the United States Military Cancer Institute (USMCI) involve promoting basic science in cancer research at USU and at the other USMCI institutions. This year, the USMCI is initiating a small funding program for collaborative cancer research. She prepared the funding announcement and arranged for the review of applications for collaborative grants in breast and prostate research. These grants will be available to researchers at USU. In addition, Doctor Cutler arranged seminars for invited speakers and arranged the scientific program for the USMCI annual meeting. As the Associate Director for Basic Science, she serves on the USMCI Executive Committee and reports to the USMCI Committee of Scientific Advisors on basic science research. Doctor Cutler serves on two grant review committees. One is the USU Merit Review Committee and the other is a study section for the Congressionally Mandated Medical Research Breast Cancer Program. In addition, Doctor Cutler serves on the Molecular Biology Advisory Committee to the American Type Culture Collection. During 2002, Doctor Cutler was the Co-Course Director of MCB 507-508, Cell Biology I and II; she was also a Lecturer in MCB 508, Cell Biology II; and, she presented lectures on *Techniques in Cell and Molecular Biology* and *Advanced Virology.*

Michael J. Daly, Ph.D., Associate Professor, USU SOM Department of Pathology, has successfully submitted a Patent Application to the United States Patent and Trademark Office, sponsored

by USU on *Radioactive Waste Detoxification*. Doctor Daly was appointed to serve on the Committee on the Origins and Evolution of Life, National Academy of Sciences, from 2003 through 2005; and, from 2000 through 2002, he served as a member of the Committee on Planetary and Lunar Exploration, National Academy of Sciences. Between 1999 and 2001, Doctor Daly served as a member of the Planetary Task Group for the National Academy of Sciences; and, from 1997 to present, he has served on Peer Review Panels for the Department of Energy. From 2002 to the present, he has supported the efforts of Doctor Aileen Marty, USU Homeland Defense Committee, through the Broadcasting of Education Programs to the Armed Forces. From 2001 through 2004, Doctor Daly continues to serve as a member of the USU Radiation Safety Committee. In addition to these activities, Doctor Daly obtained $40,000 from the Department of Energy to service and recharge the USU Co-irradiator. On February 4, 2003, Doctor Daly was featured on Swedish Television, *National Public Radio*, in a two-part documentary, *Life at Stake*. And, Doctor Daly's *Genome Informatics: Deinococcus* was published in GEO MAGAZINE in Germany on September 8, 2002. Beginning in 2000 throughout 2002, Doctor Daly served as a Lecturer and presented *Laboratory Aspects of Biowarfare* (PA0530); and, since 2001, he has lectured on *Techniques in Cellular and Molecular Biology* (MCB08-01).

Gabriela S. Dveksler, Ph.D., Associate Professor, USU SOM Department of Pathology, serves as the Chair of the USU Biosafety Committee; she also serves as the Chair of the MCB Program Admissions Committee. Doctor Dveksler was selected by the National Institutes of Health (NIH) to serve as a member of HED-1 Study Section, NIH, Institute of Child Health and Human Development. She also serves as the Editor, PCR Primer: A Laboratory Manual, Cold Spring Harbor Laboratory Press, 2nd Edition, Released in May of 2003. Doctor Dveksler is a Course Director for Techniques in Molecular and Cellular Biology.

Philip M. Grimley, M.D. Professor, USU SOM Department of Pathology, serves as a Pathology Core Course Lecturer on anemias and lymphomas. He is the Primary Instructor for the Pathology Laboratory sessions with 24 students; and, he serves as an Instructor in small group cases with 8 students. In Histology for Pathologists, he lectures on (1) *blood* and (2) *cardiovascular system*; in the Pathology for EID Program, he lectures on *Tissue Pathology of Virus Infections* (with clinical correlations); in the Biowarfare Course, he presents a lecture on *Insect Borne Virus Pathogens*. In the Pathology Graduate Courses, he lectures on *Pathogenesis* (CML) and, in the Interferon Course he lectures on *IFN Antiproliferative Mechanisms* (molecular signals). In the Molecular and Cell Biology Course (MCB508 Core Course), he lectures on (1) *Cell Cycle* and (2) *Apoptosis*. Doctor Grimley is a member of the College of American Pathologists, Laboratory Accreditation Program and serves as a Commissioner for the State of Maryland. His participation contributes to the accreditation of four military laboratories, which would otherwise need to supply personal and time to maintain accreditation. Doctor Grimley is also a member of the Study Section, of the DoD Breast Cancer Program. He is an Adjunct Professor at the University of Maryland; and, he participates in seminars, works with graduate students in the development of a Biowarfare Training Initiative. He is also a member of the United States Military Cancer Institute (USMCI) and serves on the USMCI Tissue Committee and participates in USMCI symposia. As a member of the USU Merit Review Committee, he bi-annually reviews grants for the University. Doctor Grimley has focused research on Therapeutic Modulation of Apoptosis.

Elliott Kagen, M.D., Professor, USU SOM Department of Pathology, provides three lectures and 36 laboratory instruction sessions in the MSII General and Systemic Pathology Course with approximately 75 student contact hours. Doctor Kagen provides extensive lectures during the school year: 1) Lecture to Pathology Graduate Student Program on *Oxidants and Acute Respiratory Distress Syndrome* (Topics in Pathogenesis Graduate Course); 2) Lecture to Pathology Graduate Student Program on *Mitogen-Activated Protein Kinases in Lung Injury* (Topics in Pathogenesis Graduate Course); 3) Lecture and Microscope Session to Emerging Infectious Disease Graduate Program on *Lung Infections*; 4) Lecture on Bioregulators as Putative Bioterrorism Agents to Johns Hopkins University Graduate Course, entitled: *BioTerrorism, Science and Policy: The International Scientific and Diplomatic Challenge of the 21st Century*; and, 5) Lecture to Clinical and Occupational and Environmental Medicine Program (PM0546) on *Occupational Lung Diseases and Occupational Carcinogenesis*. Doctor Kagen served as an *ad hoc* Reviewer for the National Institutes of Health (NIH) Chemical Pathology Study Section, Oncological Sciences Integrated Review Group in Washington D.C.; and as an *ad hoc* Member of the NIH Lung Biology and Pathology Study Section in Washington, D.C. since May of 2002. Since February of 2002, Doctor Kagen has been a member of the External Advisory Committee, Xavier University/Tulane University NIEHS-funded ARCH Research Program; and, he has served as an ad hoc Reviewer for the Cooperative Grants Program of the United States Civilian Research and Development Foundation (CRDF) since July of 2001. In addition, Doctor Kagen has served as an *ad hoc* Reviewer for the Veterans Administration Merit Review Board since March of 1987. Doctor Kagen is the Principal Investigator on a DoD research grant, *A Pathogenesis of Filovirus Infection by Aerosol Challenge*, with a project period from October 1, 2002 through September 30, 2003.

Colonel Morton H. Levitt, USAF, MC, USU SOM Department of Pathology, serves as a Laboratory Instructor for 24 students in Pathology2010. He is also a Small Group Instructor and teaches 16 cases to eight students over four sessions. In the course of his instruction, Doctor Levitt prepares and delivers three lectures on Male GU, Bladder, and Nutrition. Doctor Levitt is the Chief of Clinical Pathology Education; and, he is the Director of Clinical Clerkships and the Webmaster for the Department Web Site. In addition, Doctor Levitt is the Course Director for Pathology 520, for which he revised the syllabus, recruited and scheduled faculty, prepared a 60-page syllabus, prepared lectures and was responsible for the administration of the Course. He is the Co-Director of Pathology 531, which required that he revise the syllabus, recruit and schedule faculty, and provide administrative oversight. At the Walter Reed Army Medical Center, Doctor Levitt teaches residents in Surgical Pathology. Doctor Levitt serves as the Senior Officer Advisor for the Air Force and reviews all Air Force performance/fitness reports and advises the USU President and USU Brigade Commander on all promotion activities for the active duty officers assigned to the University. Doctor Levitt also serves as the Chair of the USU Controlled Substances and Alcohol Inventory Board; as such, he develops policy recommendations, conducts annual surveys of all USU Departments, and prepares an annual report to the USU President. During each year, Doctor Levitt performs surgical Pathology, cytopathology and quality assurance service for the Walter Reed Army Medical Center (WRAMC). As a Member and Vice Chair of the College of American Pathologists (CAP) Information Committee, he develops medical informatics courses, distance learning materials, and the CAP WWW Home Page; he also sets national policy standards for laboratory accreditation and coordinates, directs, and recruits faculty and teaches eight-hour Computer Roundtable Courses at the CAP national meetings. As a member of the CAP House of Delegates, he represents the State of Maryland and attends local briefings and legislative updates/training, as required. Doctor Levitt conducts on-site laboratory accreditation inspections at the request of the Regional CAP Commissioner or other CAP LAP Commissioners; he serves as either a team leader or team member. As a team leader,

he is responsible for the recruitment of inspectors, all administrative matters, and the conduct of the inspection as well as leading inbriefs/outbriefs at the facility being inspected. He is also a member of the Duke University Medical Alumni Council; and, as such, he develops policy for medical alumni CME and other activities; he plans and coordinates a regional CME activity once each year as a Council Member. And, Doctor Levitt is an active member of the Maryland Society of Pathologists.

Radha K. Maheshwari, Ph.D., Professor, USU SOM Department of Pathology, actively serves as: a member of an NIH Study Section; a member the USU Graduate Education Committee; a Program Director in the USU Graduate Education Program; as a member of the Henry M. Jackson Foundation Committee for Graduate Fellowship; a member of the University BSL-3 Committee; a member of the United States Military Cancer Research Institute (USMCI); a faculty member in the USU SOM MCB and EID Graduate Education Programs; a member of the Graduate Students Thesis Committee; a mentor to area high school students; a coordinator of the Indo-US Activities at USU; and, as an Adjunct Professor at the Birla Institute of Technology and Science located in Pilani, India. During 2002, Doctor Maheshwari organized and lectured in two courses on *Interferons* and topics in *Pathogenesis*. He also lectured in the EID Course and lectured and participated in the Bioterrorism and BioDefense Course; and, during 2002, he mentored both Graduate Education Students and Post-Doctoral Fellows. Doctor Maheshwari was an Invited Speaker at an INDO-US Colloquium on *Molecular Targets of Xenobiotic Exposure: Role in Susceptibility of Diseases*, held at the Industrial Toxicology Research Center in Lucknow, India, in January of 2003. He also was an Invited Speaker at an International Symposium and presented *Emerging Trends in Genomics and Proteomics, Education and Research* at the Birla Institute of Technology and Science in Ilani, India, in January of 2003. Also during January of 2003, Doctor Maheshwari chaired the Session on Bioremediation of Toxicants at the Birla Institute of Technology and Science; and, he was an Invited Speaker at a symposium held at the Army Hospital in New Delhi, India, which was organized by the Armed Forces Medical Services, New Delhi, India. On June 9, 2002, he was an invited member to the International Federation of Shock Societies Council Meeting held in Big Sky, Montana. And, on March 15-16, 2002, Doctor Maheshwari was an Invited Speaker and presented *Overview on 20 Years of Indo-USU Programs: Present, Past and Future* at the International Conference on Population, Development and Environment held at the Birla Institute of Technology and Science in Pilani, India.

Commander Aileen M. Marty, MC, USN, Associate Professor, USU SOM Department of Pathology, received a Meritorious Service Medal for Contributions following the Events of September 11, 2001, in June of 2002. She also received the Edward Rhodes Stitt Award as the Outstanding Laboratory Pathologist in the field of laboratory medicine from the Association of Military Surgeons of the United States; the award was presented during proceedings held on November 12-13, 2002. Doctor Marty presented 17 Invited Lectures during 2002; some examples follow: 1) Visiting Professor at the Bernhard Nocht Institute for Tropical Medicine, on January 7-9, 2002. Doctor Marty presented *The Clinical Course and Pathology of Anthrax and What Could Be Next*, at the Lecture Theater, Hamburg, Bernhard Nocht Strazza, Germany, on January 8, 2002; 2) *Spectrum of Biological, Chemical & Radiation Threat Agents - Individual and Combined Efforts as Concerns the US Navy... and Your Navy* and *Update on Navy Detection, Diagnostics, Confirmation, Prevention, & Protection from NBC Weapons with an Emphasis on Biological and Chemical Weapons* at the Deutsche Marine, Kopperpahler Allee, in Kronshagen and Kiel, Germany, on February 7, 2002; she also served as the Special Military Advisor for the Deutshe Marine, in Kiel, Germany; and, 3) *Colon Cancer in a Young Woman - The Role of Infectious Agents in Oncogenesis* was presented at the Binford-Dammin Society of Infectious Disease Pathologists

91st Annual Meeting held on February 23 through March 1, 2002, at the Sheraton Chicago Hotel in Chicago, Illinois, and, the United States-Canadian Division of the International Academy of Pathology on February 24, 2002, also in Chicago, Illinois. Doctor Marty also presented community service lectures during 2002 for: the American Bar Association International Law Section, Bioterrorism Subcommittee of the International Health Law Committee on April 16, 2002; and, the 2002 National Youth Leadership Forum on Medicine held at Georgetown University on June 26, 2002. Doctor Marty published six articles during 2002, in Parasitology, the Journal of Infectious Disease, and the New England Journal of Medicine. She also had three additional publications during 2002.

Clifford M. Snapper, M.D., Professor, USU SOM Department of Pathology, established, and serves as the Director of, the Institute for Vaccine Research (IVR) at USU during 2002. He was able to do so with the support of the USU SOM Research and Education Endowment Fund. The IVR, centered in the Department of Pathology, is an interdepartmental effort, including the Department of Pediatrics, for the development of novel, universal strategies for enhancing antibody production to poorly immunogenic proteins, peptides, and polysaccharides. **These antigens serve as vaccine targets for many bacterial and viral pathogens of clinical relevance to both military and civilian populations.** In order to facilitate commercial development of any promising approaches and/or products arising from the basic and pre-clinical studies conducted at the IVR, a Cooperative Research and Development Agreement (CRADA) was established between USU, Biosynexus, Inc., a Rockville, Maryland-based biotechnology company specializing in anti-bacterial immunity, and the Henry M. Jackson Foundation for the Advancement of Military Medicine (HMJF). Through design of novel vaccination approaches, the IVR also hopes to foster interactions with military vaccinologists in order to define clinically relevant target antigens that could be tested using the Vaccine Institute's universal adjuvanting systems. In this regard, two major projects have been initiated at the IVR on the gp350 Protein and Hybrid DNA-RNA Molecules. In addition, Doctor Snapper's laboratory has been conducting basic immunologic studies in the mouse on the mechanisms that induce *in vivo* protein- and polysaccharide-specific antibody responses to the bacterial pathogen, *Streptococcus pneumoniae*. Three separate NIH R01 grants have funded studies involving the role of dendritic cells, both helper and suppressor T cells, cytokines and chemokines, Toll-like receptors, and costimulatory molecules. These studies will help in the design of new immunotherapies and vaccines against this widespread pathogen. Some of these studies were published in The Journal of Experimental Medicine, The Journal of Immunology, and Infection and Immunity over the past year. This work has also been presented at the 2002 Midwest Immunology Conference and in seminars at the NIH, the University of West Virginia, the Fox Chase Cancer Center, and Merck.

Colonel J. Thomas Stocker, MC, USA, Professor, USU SOM Department of Pathology, serves as a Lecturer in the MSII Pathology Course; he also is an Instructor in both the MSII Laboratory Course and the MSII Small Group sessions. As further examples of his collaborative support, Doctor Stocker was a Lecturer in the following: the Histology Course; the Pediatric Seminars; the CPC Conferences at both the Walter Reed Army Medical Center (WRAMC) and the National Naval Medical Center (NNMC); the Pathology Seminars at WRAMC and NNMC; the Public Health Course at USU; and, Autopsy at NNMC. During 2002, Doctor Stocker also served as a consultant for Pediatric and Pulmonary Pathology at the Armed Forces Institute of Pathology (AFIP); and, as a consultant for the Department of Defense on Legal Issues and Pediatric Pathology.

(See Pages 160, 92, 94, and 98 in the 2002 Edition of the USU Journal for additional information on the Department of Pathology.)

Pediatrics - School of Medicine.

Lieutenant Commander Robert Englert, MC, USN, Teaching Fellow, USU SOM Department of Pediatrics, published an article, *Distinct Modes of Cell Death Induced by Different Reactive Oxygen Species*, in The Journal of Biological Chemistry during 2002. He also published an abstract, *Effects on Mode of Cell Death in B Lymphoma Cells Induced by Different Oxidants*, in Pediatric Research during May of 2002. This abstract was also presented in a poster symposium session at the spring Society for Pediatric Research Meeting in Baltimore, Maryland.

Janice L. Hanson, Ph.D., Research Assistant Professor, USU SOM Department of Pediatrics, worked in collaboration with **Elizabeth S. Jeppson, Ph.D., Adjunct Assistant Professor of Pediatrics; Colonel William S. Sykora, USAF, MC, Assistant Professor of Family Medicine**; and the USU National Capital Area Simulation Center to evaluate medical students' acquisition of skills in communicating with patients and advocating for patients and families in health care settings. Doctor Hanson presented this work at: the Council On Medical Student Education in Pediatrics (COMSEP) meeting in March of 2002; the Region IV Ambulatory Pediatrics Association meeting in Norfolk, Virginia, in January of 2002; and, during the breakfast session at the Pediatric Academic Societies meeting in Baltimore, Maryland in May of 2002. Along with **Doctor Beth Lown, Mt. Auburn Hospital and Harvard Medical School,** Doctor Hanson also presented a workshop entitled, *Shared Medical Decision-Making*, at the American Academy on Physician and Patient Research Forum in Linthicum, Maryland, in March of 2002.

Lieutenant Commander Christine L. Johnson, MC, USN, Assistant Professor, USU SOM Department of Pediatrics, NCA Site Coordinator for the Third-Year Pediatric Clerkship, Fourth-Year Pediatric Programs Director, American Academy of Pediatrics Committee on Environmental Health, Education Subcommittee Member, and Liaison with the Agency for Toxic Substances and Disease Registry (ATSDR), Department of Health and Human Services, has initiated a proposal to establish a Pediatric Environmental Health Specialty Unit (PEHSU) at USU. Children and fetuses are at extremely high risk from certain toxic exposures because of their unique physiological and developmental vulnerability. A DoD PEHSU at USU would provide critical education and consultation services to uniformed health care providers worldwide. This unit would augment the existing units across the United States, Canada, and Mexico utilizing its unique role to address issues specific to military populations. A military PEHSU would add specialized knowledge of the many complex
defense-related exposures not found in the civilian sector. The USU PEHSU would become an essential component of the military unique curriculum of military residency training programs providing education in the area of environmental health.

Lieutenant Colonel Woodson Scott Jones, USAF, MC, Assistant Professor, USU SOM Department of Pediatrics, and Associate Director of the Third-Year Pediatric Clerkship, was elected Vice President of the American Academy of Pediatrics, Uniformed Services Chapter East, representing over

300 Fellows in the Academy's affairs. He also has continued his collaborative efforts with the Dartmouth Medical School and the Council on Medical Student Education in Pediatrics (COMSEP), serving on the Computer-Assisted Instruction (CAI) Advisory Group for the Development of the Computer-Assisted Learning Project in Pediatrics (CLIPP), a program of Internet-based, self-directed learning materials to be used by medical students internationally.

CAPT Ildy M. Katona, MC, USN, Professor of Pediatrics and Medicine, Chair, USU SOM Department of Pediatrics, was elected to the American Pediatric Society (APS). Membership in the APS has been accorded to individuals who have distinguished themselves in leadership, teaching, research, and contributions to Pediatrics at the national and international levels. APS had 988 active members nationally during the Spring of 2002.

Major William Leftkowitz, MC, USA, Teaching Fellow, USU SOM Department of Pediatrics, published the article, *Oxygen and Resuscitation: Beyond the Myth*, in Pediatrics during 2002. He also published the abstract, *Where does the developing brain get its docosahexaenoic acid?* in Pediatric Research during May of 2002. This abstract was presented in a platform session at the spring Society for Pediatric Research Meeting held in Baltimore, Maryland.

Lieutenant Colonel (promotable) Jeffrey Longacre, MC, USA, Assistant Professor, USU SOM Department of Pediatrics, was invited and presented a seminar titled, *Mercury Toxicity, A Clinical Perspective*, at the Russian Academy of Sciences 7th International Symposium on Metal Ions in Biology and Medicine, at St. Petersburg, Russia. As part of a multi-disciplinary team of experts from the Armed Forces Institute of Pathology (AFIP), the Environmental Protection Agency (EPA), and the United States Geological Survey (USGS), Doctor Longacre conducted a short course for symposium attendees titled, *Environmental Pathology and Exposure to Toxic Metals*. He also published the article, *Lead as a Threat to the Health of Children from the City of Vladivostok*, in the May 2002 edition of Trace Elements in Medicine, following several site visits to Vladivostok, Russia, at the invitation of the Primorsky Krai Department of Public Health. The site visits were conducted as part of a multi-disciplinary medical ecology team sponsored by the United States Pacific Air Force/Pacific Command (PACAF/PACOM). And, he was selected to the United States Army Pediatrics Board of Directors, serving as the USU advisor and liaison to the Pediatric Consultant of the Surgeon General of the United States Army. Doctor Longacre and **Lieutenant Colonel Woodson Scott Jones, USAF, MC, Assistant Professor of Pediatrics,** were recognized as the authors of the only English language on-line interactive case used by CASUS CURAE (Germany) that was awarded the European software development prize, *Multimedia in Healthcare 2001*, for excellence and innovation in multimedia software. The Computer-Assisted Learning in Pediatrics Project (CLIPP) is a cooperative effort by the Council on Medical Student Education in Pediatrics (COMSEP) and the Dartmouth Medical School; and, it is funded by the Bureau of Health Professions, United States Department of Health and Human Services.

Kathleen B. Madden, Ph.D., Research Assistant Professor, is a co-investigator on a five-year, $1.25 million National Institutes of Health (NIH) grant, *GI Nematodes and Gut Functional Responses to Inflammation*. Doctor Madden's primary research interests are in the field of immuno-parasitology, with special emphasis on cytokine regulation of the host's response to infection with gastrointestinal nematodes.

Doctor Madden works in collaboration with **Captain Ildy M. Katona, MC, USN, Professor of Pediatrics and Medicine, and Chair, USU SOM Department of Pediatrics**, delineating cytokine regulation of mucosal mast cell hyperplasia; and, with **Terez Shea-Donohue, Ph.D., Research Professor of Medicine, USU, and Research Physiologist, USDA,** investigating neuroimmune regulation of gut epithelial cell function. Doctor Madden presented this research at the annual meeting of the American Gastroenterological Association in San Francisco, California, during May of 2002.

Major Janice Nicklay-Catalan, MC, USA, Teaching Fellow, USU SOM Department of Pediatrics, published work she completed as a Neonatal Fellow from 1997 to 2000; *Cognitive Deficits in Docosahexaenoic Acid-Deficient Rats* was published in Behavioral Neuroscience during 2002.

Felipe E. Vizcarrondo, M.D., Assistant Professor of Pediatrics, and **Lieutenant Commander Jeffrey R. Lukish, MC, USN, Assistant Professor of Surgery and Pediatrics,** co-hosted the **16th Annual Pediatric/Pediatric Surgery Symposium** on June 13, 2002. The topic was *Current Concepts in Pediatric Renal Disease.*

Other Department of Pediatrics Programs and Achievements.

The **3rd Annual C. Everett Koop Distinguished Lecture** was delivered by **James A. O'Neill, Jr., M.D., J.C. Foshee Distinguished Professor of Surgery and Chairman, Section of Surgical Sciences of the Vanderbilt School of Medicine.** Doctor O'Neill's presentation was entitled, *Renovascular Hypertension in Childhood.*

Under the leadership of **Lieutenant Colonel (promotable) Jeffrey Longacre, MC, USA, Director of Pediatric Medical Education,**
the Ambulatory Pediatric Association (APA) recognized the USU Third-Year Pediatric Clerkship with the Outstanding Teaching Award for 2002. This coveted award recognizes excellence in the teaching of ambulatory pediatrics by giving national recognition to an outstanding ambulatory pediatric program. Competition includes military and civilian undergraduate, graduate, and postgraduate pediatric training programs form across the United States. Programs must demonstrate excellence in educational teaching methods and the program innovations and adaptability. ***The USU Pediatric Education Section was previously awarded this national recognition in 1991, making it the only program to have ever been recognized twice in the history of the award.*** The current Pediatric Education Section includes **Lieutenant Commander Christine Johnson, MC, USN, Assistant Professor, USU SOM Department of Pediatrics; Lieutenant Colonel Woodson Scott Jones, USAF, MC, Assistant Professor, USU SOM Department of Pediatrics; Colonel Virginia Randall, MC, USA, Associate Professor, USU SOM Department of Pediatrics; Janice L. Hanson, Ph.D., Research Assistant Professor, USU SOM Department of Pediatrics;** and, **Felipe Vizcarrondo, M.D.** All previous Pediatric Education Section members were duly recognized as well for their contributions over the years leading to this recognition. The USU Pediatric Education Section was invited and conducted a medical education workshop titled, *Structured Clinical Observations*, at the annual American Academy of Pediatrics/Uniformed Services Pediatric Seminar 2002 in San Diego, California, which included pediatricians and primary care providers from all of the Uniformed Services stationed around the globe.

The Department of Pediatrics Education Section continues to offer the Uniformed Services Faculty Development Course (USFDC) under the direction of its Executive Director, **Lieutenant Colonel (promotable) Jeffrey Longacre, MC, USA**. The course involves USU faculty experts in medical education who provide seminars, workshops, and consultation on a broad range of medical education topics. Following the inaugural course at the Uniformed Services Pediatric Seminar in 2001, the course has since conducted on-site seminars and workshops at the Tripler Army Medical Center in Hawaii, the Naval Medical Center in Portsmouth, Virginia, and the Keesler Air Force Medical Center in Biloxi, Mississippi. It is scheduled for several additional military teaching sites during 2003.

The Military Medical Humanitarian Assistance Course (MMHAC), administered by the Education Section of the Department of Pediatrics, under the direction of its **Executive Director, Lieutenant Colonel (promotable) Jeffrey Longacre, MC, USA,** has now graduated over 500 participants. This course provides military healthcare workers with the knowledge and skills essential for the care of civilian populations in complex humanitarian crises. The content of this two-day course focuses on understanding the unique health environment, emphasizing population health approaches, and recognizing and managing those conditions often associated with high mortality among the most vulnerable populations in these settings. Interactive scenarios, taken from actual experiences of the instructors, focus on the role that United States military medical assets would likely play as early responders to a humanitarian emergency with limited medical resources. On average, the course is provided monthly throughout the United States, sponsored by the USU Department of Pediatrics and accredited for Continuing Medical Education credit by the USU Office of Continuing Education for Health Professionals.

Pharmacology - School of Medicine.

Departmental Activities.

Importance and Significance of Research Programs in the Department of Pharmacology. The Department of Pharmacology's areas of research are important in the development of the discipline of pharmacology and for biomedical education. The Department's research strengths are in the major areas of molecular and cellular neuropharmacology and signal transduction mechanisms. The Department expects these areas will produce many valuable insights and are most likely to prove to be fruitful topics for continued research concentration. **These areas also have implications for military medicine.** Extreme and rapid changes in the environment are a frequent feature on the battlefield. Department studies explore the molecular, cellular, and systems implications of changes in the chemical or physical environment of an organism. These basic studies on the mechanisms underlying cellular adaptations may lead to ways of reducing the negative consequences of such adaptations while retaining the valuable features of adaptations enhancing survival.

Individual Research in the areas of Molecular and Cellular Neuropharmacology and Signal Transduction Mechanisms.

Suzanne B. Bausch, Ph.D., Assistant Professor, USU SOM Department of Pharmacology, continues her studies on *Synaptic Alterations in Epilepsy*. Doctor Bausch's research is made possible by funding from the National Institutes of Health (NIH), *Axonal Sprouting of GABAergic Neurons in Epileptogenesis*, the Epilepsy Foundation, *Activity and NMDA Receptor Activation in Epileptogenesis*, and the Department of Defense Brain and Spinal Cord Injury Program (DBSCIP), *Glutamate Receptors in Epileptogenesis*.

Beata Buzas, Ph.D., Research Assistant Professor, along with Doctor Brian Cox, addresses studies on the *Regulation of Opioid Systems in Pain, Injury, and Drug Tolerance*. Doctor Buzas research is made possible by funding from the Department of Defense Brain and Spinal Cord Injury Program (DBSCIP), *Neurochemical m/Medicatiors in Penetrating Brain Injury*, and the Defense/Veterans Head Injury Program, *Opioid Peptides and Oxidative Stress*.

Thomas E. Cote, Ph.D., Associate Professor, USU SOM Department of Pharmacology, focuses his studies on *RGS Proteins and Regulation of Opioid Receptor Signaling*. In the area of Signal Transduction Mechanisms, Doctor Cote studies *RGS Proteins and Regulation of Opioid Receptor Signaling*.

Brian M. Cox, Ph.D., Professor and Chair, USU SOM Department of Pharmacology, along with Doctor Buzas, addresses studies on the *Regulation of Opioid Systems in Pain, Injury, and Drug Tolerance*. Doctor Cox's research is made possible through funding from the National Institutes of Health (NIH).

Jeffrey M. Harmon, Ph.D., Professor, USU SOM Department of Pharmacology, continues his studies on *Regulation of Glucocorticoid Receptor Expression*.

Cinda J. Helke, Ph.D., Professor, USU SOM Department of Pharmacology, and Associate Dean for Graduate Education, addresses *Diabetic Autonomic Neuropathy*.

J. Brian McCarthy, Ph.D., Assistant Professor, USU SOM Department of Pharmacology, focuses on both the *Mechanism of Structural Plasticity in the Brain* and the *Regulation of Synaptic Receptor Targeting*. Doctor McCarthy's research on the *Development of Dendritic Protein Synthetic Components*, is made possible through funding from the National Institutes of Health.

John M. Sarvey, Ph.D., Professor, USU SOM Department of Pharmacology, continued his research on the *Signaling in the LTP Model of Learning and Memory* until his death in 2003.

Aviva J. Symes, Ph.D., Associate Professor, USU SOM Department of Pharmacology, focuses his research on *Cytokine Regulation of Neuronal Gene Expression.* The Department of Defense Brain and Spinal Cord Injury Program (DBSCIP) funds Doctor Symes's research on *Molecular Mechanisms of TGF-beta Signaling in Glial Scar Formation after CNS Injury.* The National Institutes of Health (NIH) funds his research on *Cytokine Regulation of VIP Gene Expression*; and, the Christopher Reeves Paralysis Foundation funds his study on *The Role of Smad3 in Glial Scar Formation After Spinal Cord Injury.*

The research programs of **Doctors Bausch, Cote, Cox, Harmon, Helke, McCarthy, Sarvey** and **Symes** address issues relating to adaptations of the nervous system following changes in activity associated with an altered cellular environment or with application of external stimuli, injury, or other stresses. Doctor Bausch's and Doctor Sarvey's electrophysiology laboratories examine various aspects of synaptic adaptation following seizures (Bausch) or after high-frequency electrical stimulation inducing long-term potentiation (Sarvey). Doctor Bausch's laboratory is examining structural adaptations in GABA and Glutamate synapses in the hippocampus following repeated episodes of seizure activity. Doctor Sarvey's work on long-term potentiation led to studying the role of endogenous zinc in synaptic function as a facilitator of long-term potentiation and as a neurotoxic factor liberated during ischemic injury to the brain. Doctor J. Brian McCarthy's laboratory investigates the targeting of metabotropic glutamate receptors, identifies sorting signals, investigates the hormonal regulation of structural modification in the nervous system, and explores the role of local protein synthesis in dendrites toward synaptogenesis in the hippocampus.

The molecular mechanisms underlying neural injury are also studied in the laboratories of Doctors Aviva Symes, Brian Cox, and Cinda Helke. The Symes and Cox laboratories examine the release of cytokines in response to neural injury and their roles in the regulation of expression of neuropeptides. Doctor Symes's laboratory explores factors regulating the expression of vaso-active intestinal polypeptide (VIP) in the brain resulting from neural injury. Doctor Cox's laboratory studies the expression of endogenous opioids and their relevance to the control of pain and inflammation following injury to the nervous system. The Cox and Cote laboratories are also studying adaptations in opioid peptide and receptor function related to chronic drug exposure. Doctor Helke's laboratory studies the mechanisms underlying disruption of autonomic nervous system function in diabetes. Her studies have demonstrated metabolic, oxidative, neurochemical, and functional deficits in the vagus nerve and other autonomic nerves following sustained hyperglycemia.

Impaired function of neurotrophins and oxidative injury associated with hyperglycemia have been demonstrated. Doctor Harmon is studying the function of glucocorticoid receptors in the central nervous system. Doctor Reid examines factors controlling differentiation of neural precursor cells during neural development. Diseases that affect nerve cells often result in permanent, life-altering disabilities. More than 5,000,000 Americans are currently afflicted by a neurodegenerative disorder. In peacetime, over 8,000 Americans with traumatic brain injury (TBI) are admitted to military and veterans hospitals. **In combat, traumatic brain injury accounts for at least 14 percent of surviving casualties and a disproportionate amount of acute and long-term combat casualty care resources. Understanding the genes that control neuronal generation and specification in the central nervous system would likely figure prominently in treatments aimed at replacing damaged nerve cells.**

These research programs relate to issues of critical importance to health care in a military environment. Seizure generation, impairment of learning and/or memory, and neurodegeneration

are frequent consequences of accidental and battlefield neural injuries. Improved understanding of these events should lead to more effective therapies. These studies can be of great benefit to military personnel who are at increased risk of sustaining a brain injury during the performance of their duties. Defining the mechanisms, that control brain development and brain formation, is critical to our understanding of normal developmental processes and may be a key to treating Alzheimer's and Parkinson's Disease. Collectively, these studies of adaptations of the nervous system following changes in the neuronal environment indicate the wide range of adaptive processes, that can occur in the nervous system, and point the way to potential novel therapies.

Doctors Harmon, Symes, and Cote are actively involved in addressing aspects of the function of critical cellular transduction systems. Doctor Harmon's laboratory is exploring the role of abnormalities in glucocorticoid receptor expression and/or function in impaired function of the hypothalamic-pituitary adrenal axis and in resistance to steroid therapy in cancer.

Doctor Symes is exploring the control of gene transcription in the nervous system by cytokines. These studies are beginning to elucidate fundamental changes in neural function that are induced by enhanced cytokine expression in neural injury.

Doctor Cote studies the role of GTP-binding proteins (G proteins) that mediate the actions of a very large number of neurotransmitters and hormones utilizing G protein coupled receptors (GPCR). Understanding the role of a novel family of G protein regulator molecules may lead to new understanding of the regulation of cell function by GPCR in general. **These studies also have specific application to studies of tolerance and dependence to opiate drugs** being studied in a collaboration between the laboratories of Doctors Cote and Cox. The research programs of Doctors Helke and Sarvey also involve analysis of signal transduction systems activated by transmitters, neurotrophins or oxidative stress, and their adaptations in response to a changing cellular environment.

These studies have important implication for the understanding of regulators of biologic functions at the molecular, cellular, and biological systems levels. **Individual projects provide insight into the adaptive responses of the nervous system, the roles of glucocorticoids in post-traumatic stress disorders, and on cell communication and cell death in relation to the treatment of some cancers.**

During 2002, the faculty members of Pharmacology published in peer-reviewed journals, were invited speakers at national and international meetings, and contributed substantial professional service at area High Schools, on boards of professional associations and societies, and as mentors and consultants in Summer Research Internship in Biological Sciences Programs.

Preventive Medicine and Biometrics - School of Medicine.

Doctor Leonelo E. Bautista, M.D., MPH, DrPH, Assistant Professor, ***the Division of Epidemiology and Biostatistics,*** continues at the forefront of cardiovascular disease research, namely the role of inflammatory disease and biochemical markers of inflammatory disease in the genesis of heart disease. With six published papers during 2002, several invitations to speak at international meetings, and new funding, Doctor Bautista continues to be regarded as one of the brightest new researchers at the University.

Heidi B. Friedman English, Ph.D., Assistant Professor of Epidemiology, Department of Preventive Medicine and Biometrics, led an international team of health scientists and administrators in competing for, and receiving, a National Institutes of Health (NIH) grant to develop a medical research ethics curriculum in Peru and the United States. The three-year, $500,000 NIH grant will establish a bi-lingual, multi-cultural training program in research ethics for Ministry of Health personnel in charge of Peru's health research programs and facilitate an enhanced research ethics review capacity throughout the country. The grant team includes faculty and staff from USU, the Walter Reed Army Medical Center, the Pan American Health Organization's Regional Program on Bioethics, and the Peruvian Ministry of Health. Faculty of San Marcos University and the Cayetano University of Lima, both long-term research collaborators with USU School of Medicine Dean Larry W. Laughlin, will also participate in the project.

Deborah C. Girasek, MPH, Ph.D., Assistant Professor, USU SOM Department of Preventive Medicine and Biometrics, in conjunction with teaching her Health Promotion Course, oversaw a needs assessment/service project at the request of professionals at the National Naval Medical Center who sought to improve their Headache Self-Care Course. Doctor Girasek was also invited to attend a meeting of experts who had been asked to consult on the National Center for Child Health and Development (NICHD's) ground-breaking study, *Behavioral and Environmental Risk Factors for Childhood Drowning*. In addition, Doctor Girasek provided input to the TRICARE Management Activities Office in support of a survey instrument being developed for retirees. Her research, published in Pediatrics, found that child safety seat instructions are written at the 10th grade reading level on average. This is problematic because 46 percent of adults in the United States read at, or below, the 8th grade level, according to the United States Department of Education. Motor vehicle crashes are the leading cause of death for children in America and prior studies have shown that child safety seats are incorrectly installed at least 80 percent of the time.

Grant D. Huang, Ph.D., MPH, Assistant Professor, USU SOM Department of Preventive Medicine and Biometrics, and Director, Occupational Ergonomics Program, was involved in the planning, designing, training, and management of the integrated case management component of the *DoD Work Safety Demonstration Project*, a Congressionally mandated project. In addition, Doctor Huang is part of an advisory panel for the *DoD Workers Compensation Best Practices Initiative*, a DoD-wide effort to address significant problems with the DoD Workers' Compensation Program in relation to worker injury and workplace safety. Also, Doctor Huang received a Pilot Project Research Training Award from the Johns Hopkins National Institute for Occupational Safety and Health Education and Research Center; his research will focus on predictors of clinic visits for musculoskeletal-related injuries/illnesses in the United States Marine Corps. He was a primary and co-author on two publications on work-related musculoskeletal disorders in peer-reviewed journals, one book chapter; and, he provided ten presentations at national or international scientific conferences during 2002.

CAPT Gerald Quinnan, M.D., USPHS, Professor and Chair, USU SOM Department of Preventive Medicine and Biometrics, was highlighted in the Health Affairs Weekly Activities Report upon his selection as Chair of the Department of Preventive Medicine and Biometrics (PMB) during the week of October 14, 2002. Doctor Quinnan is an internist/infectious disease specialist who had a distinguished career at the Food and Drug Administration (FDA), which included senior leadership positions, before his arrival at USU in 1994. His USU career began in PMB, where he has established a public health vaccine research program.

CAPT Richard J. Thomas, MC, USN, Director, USU National Capital Consortium Occupational and Environmental Medicine Residency, was elected President of the Virginia College of Occupational and Environmental Medicine (VCOEM) for a two-year term. The American College is composed of 31 Occupational and Environmental Medicine component societies (including VCOEM) located in the United States, Canada, and Mexico; the physician members hold scientific meetings and network on a regular basis. VCOEM has 125 members and represents the professional development of Occupational Medicine physicians for the Medical Society of Virginia. CAPT Thomas was also elected Chairperson of the Military Occupational Medicine Special Interest Group, American College of Occupational and Environmental Medicine (ACOEM) for a two-year term; the ACOEM represents more than 6,000 physicians specializing in the field of Occupational and Environmental Medicine. The Military Occupational Medicine Special Interest Group provides educational forums for military and civilian members to learn more about advances in the field of military occupational medicine.

CAPT David H. Trump, MC, USN, Assistant Professor, USU SOM Department of Preventive Medicine and Biometrics, continues his research into the health effects of military deployments. Post-deployment medical syndromes are not new to the military experience, but recent experiences following Desert Storm/Desert Shield have once again highlighted the importance of this field of study. With six new articles published during 2002, CAPT Trump continues to provide significant findings in this area of concern.

Department Activities.

The Division of Aerospace Medicine has been providing course work in the area of applied Aviation Physiology for the past three years as a specialty track in the Master of Public Health Program offered by the Department of Preventive Medicine and Biometrics. This track consists of five courses: Aviation Operational Physiology I and II; Aviation Human Factors; Aviation Exercise Physiology; and, Special Topics in Aviation Physiology. This course of study prepares students for a career in the military as an Aviation Physiologist. Since its beginning in 1999, six students have completed the program and three additional students have audited the course. The program has expanded with each year; a flight familiarization aspect was recently added through a memorandum of understanding with NAS Pax River.

The First Canadian Graduate of the USU National Capital Consortium Occupational and Environmental Medicine Residency Program. The Canadian Forces received the first Canadian Physician trained in the USU/National Capital Consortium Occupational and Environmental Medicine Residency Program in June of 2003. **Lieutenant Ian Torrie** joined the residency program in July of 2001, after his undergraduate years at the University of New Brunswick, Medical School at the University of Newfound and Family Practice Residency at the University of British Columbia. He has extensive operational experience in a variety of assignments with the Canadian Forces including a deployment with NATO Forces in Bosnia. The USU/NCC two-year residency program combines academic training in a Master of Public Health Degree and a series of clinical, field, and administrative rotations of one to two months each.

Donald R. Roberts, Ph.D., Professor, PMB Division of Tropical Public Health; **Richard G. Andre, Ph.D., Professor, PMB Division of Tropical Public Health**; and, **Lieutenant Colonel Leon Robert, MS, USA, Associate Professor, PMB Division of Tropical Public Health**, undertook an investigation of a malaria outbreak in Northern Virginia on behalf of Montgomery County, Maryland. Through established agreements, this activity represented a major undertaking for the Division of Tropical Public Health during the months of October and November, 2002. The University received considerable attention in the press and in local government as a result. Doctor Roberts presented the results of that outbreak investigation to the Council of Governments for the National Capital Region. In addition, Doctor Leon Robert coordinated a meeting that included local governments, the CDC, and USU to review the outbreak. Doctor Roberts made a formal presentation at the meeting; he also published a letter in the OP-ED section of the Washington Post on the merits of spraying insecticides for disease control; and, he was an invited contributor to a book being published by the Institute of Medicine on pathogen resistance to drugs and vector resistance to insecticides.

(*See Pages 170, 222-240, 321-323, and 325-326 in the 2002 Edition of the USU Journal for additional information on the Department of Preventive Medicine and Biometrics.*)

Psychiatry - School of Medicine.

Departmental Activities.

In conjunction with the USU National Capital Area Medical Simulation Center (SIMCEN) faculty, **Colonel Molly J. Hall, USAF, MC, Associate Professor, USU SOM Department of Psychiatry**; **Lieutenant Commander Lisa J. McCurry, MC, USN, Assistant Professor, USU SOM Department of Psychiatry**; and, **Doctor Tim Lacy** conducted and presented pilot work in the use of simulated patients to teach psychiatry. They discussed their preliminary findings at the Annual Meeting of the American Psychiatric Association in Philadelphia, Pennsylvania. **Technical Sergeant Keira Jones, USAF,** aided this project through data collection and data entry.

Consistent with the Department of Defense's requirement to provide behavioral health expertise for mass casualty responses, population oriented behavioral health programs and behavioral health epidemiology, the Department of Psychiatry developed, and the United States Army approved, ***a new two-year Disaster/Preventive Psychiatry Fellowship sponsored by the National Capital Consortium***. The program matriculated its first Fellow in the Summer of 2003. In addition to applying through the established Graduate Medical Education route, candidates must also apply to the School of Medicine Graduate Education Programs and be accepted by the USU Master of Public Health Program for the first year. The second year of the Fellowship is spent with the Department of Psychiatry's Center for the Study of Traumatic Stress (CSTS) and includes didactics, research, and rotations at other institutions.

Emmanuel G. Cassimatis, M.D., Professor of Psychiatry, Associate Dean for Clinical Affairs, was elected to the Executive Committee of the Accreditation Council for Graduate Medical Education (ACGME). During 2002, Doctor Cassimatis was also the Chair-elect of the American Medical Association (AMA) Council on Medical Education and the Immediate Past Chair of the AMA Specialty and Service Society (the caucus of all of the Specialties and Services represented in the AMA House of Delegates).

Doctor Cassimates also presented the keynote address, Terrorism our World and Our Way of Life, during the 2002 annual meeting of the American Academy of Psychoanalysis (AAPsal) in Philadelphia, Pennsylvania; he was also selected to co-chair the next AAPsal annual meeting to be held in San Francisco, California, during May of 2003.

CAPT Thomas Grieger, MC, USN, Associate Professor, USU SOM Department of Psychiatry, served as a senior faculty member during a joint service humanitarian mission to provide mental health education and consultation to the Republic of South Africa Defense Forces; and, he spoke at several national meetings regarding the principles of the psychiatric response to disaster and terrorism and Navy Medicine's response to the September 11, 2001 attack on the Pentagon. ***CAPT Grieger continues to serve as the Residency Director for the National Capital Consortium Psychiatry Program.*** With fifty-six positions, it is the largest graduate medical education program in the Department of Defense. Rotation sites for residents include the Walter Reed Army Medical Center, the National Naval Medical Center, the Malcolm Grow Air Force Medical Center, and the Northern Virginia Mental Health Institute.

Edmund G. Howe, III, M.D., J.D., Professor, USU SOM Department of Psychiatry, continues to serve as the Editor-in-Chief of the highly regarded Journal of Clinical Ethics.

E. Fuller Torrey, M.D., Co-Director of the Stanley Laboratory of Brain Research and Professor, USU SOM Department of Psychiatry, was interviewed by *Nightline* and highlighted in the Health Affairs Weekly Activities Report during March of 2002. *Nightline* visited the Stanley Brain Research Institute to shoot *"B-Roll"* which served as a background for an interview segment with Doctor Torrey. Doctor Torrey is a world-recognized expert on schizophrenia, an illness that received renewed interest due to the hit movie, *A Beautiful Mind.* During 2002, the Stanley Brain Research Laboratory received an additional 68 donor brains, bringing the total to 507; the laboratory shipped a total of 14,785 brain sections and blocks to research laboratories around the world, thus enabling research in schizophrenia and other illnesses. Doctor Torrey received the William C. Porter Lecture Award at the annual meeting of the Association of Military Surgeons of the United States (AMSUS) and the Irving Blumberg Human Rights Award from the World Association of Psychosocial Rehabilition. In addition, Doctor Torrey was profiled on *60 Minutes*, *American Medical News* and *Stanford Magazine.* He also co-authored the book, Surviving Manic Depression: A Manual on Bipolar Disorder for Patients, Families and Providers (Basic Books, 2002).

Robert J. Ursano, M.D., Professor and Chair, USU SOM Department of Psychiatry, and an internationally recognized expert on Post Traumatic Stress Disorder (PTSD), was asked to serve on the planning committee for the annual Rosalynn Carter Symposium on Mental Health Policy. The 2002 theme was *Status Report - Meeting the Mental Health Needs of the Country in the Wake of September 11th.* Also highlighted in the Health Affairs Weekly Activities Report during the week of October 14, 2002, was an invitation to Doctor Ursano from the National Academy of Sciences (NAS) to be the keynote speaker at a NAS workshop on the psychological consequences of terrorism and systems for response. Doctor Ursano is a member of the Institute of Medicine, National Committee on Responding to the Psychological Consequences of Terrorism. In December of 2002, Doctor Ursano was notified that he had been elected to the Academy of Medicine, Washington, D.C.; and, he was also asked to speak in March of 2003 by the American Society for Industrial Security, the world's largest and most prestigious association of

security professionals. The Society recognized Doctor Ursano as "a world renowned subject matter expert on the psychological consequences of a terrorist attack." In addition, Doctor Ursano continues to serve as Editor of the journal, Psychiatry: Interpersonal and Biological Processes, which was founded by Harry Stack Sullivan in 1938.

(*See pages 47, 116, 117, and 214-221 in the 2002 Edition of the USU Journal for additional information on the Department of Psychiatry.*)

Radiology and Radiological Sciences - School of Medicine.

Background.

In October of 2002, the Board of Regents approved the request to ***change the name of the Department of Radiology and Nuclear Medicine to the Department of Radiology and Radiological Sciences***. The name change was requested by the faculty of the Department to better reflect their diverse interests, talents, and research efforts in the Radiological Sciences.

Lorraine G. Shapeero, M.D., Associate Professor, USU SOM Department of Radiology and Radiological Sciences, was an invited speaker at the International Skeletal Society in Geneva, Switzerland, where she discussed her research on *Dynamic MRI and Total Body MRI for evaluating musculoskeletal metastases and recurrences and their response to treatment.* This past year, Doctor Shapeero served as Secretary of the Musculoskeletal Study Group of the International Society of Magnetic Resonance in Medicine. In addition, Doctor Shapeero was re-elected to the Board of Directors of the Association of University Radiologists; and, she served on the Executive Committee of the Association of Medical Student Educators in Radiology.

(*See pages 92, 93, 94, 171, and 208 in the 2002 Edition of the USU Journal for additional information on the Department of Radiology and Radiological Sciences.*)

Surgery - School of Medicine.

Background.

Undoubtedly, the highlight in the Year 2002 for the Chairman and Faculty was the 25th Anniversary Celebration on October 11-12, 2002. Beginning in 1977, Professor Norman M. Rich, M.D., established a non-traditional Department of Surgery at USU. During times of resource constraints and repeated threats of closure for the University and the School of Medicine, he attracted faculty, developed a military medical surgical curriculum, and began a fledgling research program. For the past 25 years, the mission of the USU Department of Surgery has been to support USU as the Nation's Federal Health

Science University, committed to excellence in medicine and public health during peace and war. This includes providing the Nation with surgeons dedicated to career-service in the Department of Defense and the United States Public Health Service and also scientists who serve the common good. The efforts and accomplishments of its faculty have made the USU SOM Department of Surgery nationally and internationally recognized.

One of Doctor Rich's successful innovative ideas was to start a bi-monthly Distinguished Visiting Professor Program, which not only benefitted students, but introduced nationally and internationally known surgeons to the school and to the outstanding student body of USU. A second unique effort was to establish the USU Surgical Associates, which served as a model for the founding of the Henry M. Jackson Foundation for the support of medical education and research.

All of this was accomplished through the dedicated efforts of **Norman M. Rich, M.D., Professor and Chair, USU SOM Department of Surgery; Charles Rob, M.D., Professor Emeritus, USU SOM Department of Surgery; Harris Shumacker, M.D., Professor Emeritus, USU SOM Department of Surgery; Leonel Villavicencio, M.D., Professor, USU SOM Department of Surgery; William R. Drucker, M.D., Professor, USU SOM Department of Surgery; Carl Hughes, M.D., Professor Emeritus, USU SOM Department of Surgery;** and, **David C. Wherry, M.D., Professor, USU, SOM Department of Surgery,** all of whom joined the faculty early on following the Department's establishment in 1977. Following their retirement from active duty, Senior Surgeons **John E. Hutton, Jr., M.D., BG, USA (Retired), Professor, USU SOM Department of Surgery; Frederick Plugge, M.D., Professor Emeritus, USU SOM Department of Surgery,** and **Donald Sturtz, RADM, USN (Retired), Professor, USU SOM Department of Surgery,** joined the Department.

A series of outstanding young surgeons, representing all of the Uniformed Services and surgical specialties, have also made their own contributions to the Department's well-defined Strategic Plan for ***Learning to Care for Those in Harm's Way.*** Notable among this group are **COL David Burris, Associate Professor and Interim Chair, USU SOM Class of 1982**; and, **COL Christoph Kaufmann, Associate Professor, USU SOM Class of 1982.**

The distinguished list of nationally recognized surgical leaders who lent their wisdom, counsel, and insight to the Department reads like a *Who's Who of Surgery*; included are names such as **Michael DeBakey, Francis Moore, David Sabiston, John Connally, Ben Eiseman, Oliver Beahrs, George Sheldon, John Mannick, John Potter, C. Everett Koop**, and many more. International supporters have included **Doctor Daniel Rignault of France; Doctor James Ryan of the United Kingdom**; and, other renowned surgeons from every major nation in the world.

Since the Department's establishment, the Chairs of Surgery at the Malcolm Grow Medical Center, the Walter Reed Army Medical Center, the Portsmouth Naval Hospital, the San Diego Naval Hospital, and others and their staffs have enthusiastically accepted and taught the third and fourth-year Medical Students the art and science of surgery.

Current Departmental Activities.

The scientific and historical talks of October 11-12, 2002, documented the growth of robust teaching, research, and academic accomplishments during the Department's first 25 years. During the

meeting, **USU President, James A. Zimble, M.D., VADM, USN (Retired),** announced that henceforth, the Department would be known as the *Norman M.Rich Department of Surgery*. More recently, **Stanley L. Minken, M.D., Professor, USU SOM Department of Surgery,** was named Head of the Division of Academic Surgery; and, new programs and policies are being developed to standardize the surgical subject matter being taught at the training/teaching hospitals. A mentoring program has also been developed to attract and train the surgical specialists needed by the Military Health System. **Doctor Hasan Alam** received a grant from the National Institutes of Health (NIH) for the *Forward Treatment of Hemorrhagic Shock.* Doctor Alam is the first author on six publications in peer-reviewed journals overseeing $6 million in grants primarily related to hemorrhagic shock and resuscitation. All of his research is directly related to combat casualties and methods to improve survival in cases of acute blood loss. Under the leadership of **Interim Chairman COL David Burris, MC, USA,** it is anticipated that the next 25 years will be as exciting and productive as the first 25.

International Exchange Program.

Major M.C. Humberto Carrasco Vargas, Instructor in Neurology, USU SOM, International Scholar, Walter Reed Army Medical Center, was an excellent example of a successful international exchange program between USU and the University of the Army and Air Force of Mexico. As the **Director of the International Relations Committee of the USU SOM Department of Surgery, J. Leonel Villavicencio, M.D., FACS,** was able to report that Major Vargas, on March 3, 2002, presented the American Academy of Neurology Residency in-Service Training Examination and obtained the highest scores in the Neurology Department at the Walter Reed Army Medical Center; he finished the examination in the 95th percentile among all of the National examinees (more than 1,000 in the United States).

Collaboration with the United States Military Cancer Institute.

The United States Military Cancer Institute (USMCI) is a TriService entity with a mission to coordinate cancer patient care, education and research across Services and Specialties. There are over 70 members in the USMCI who are organized into a number of programs. These programs include: prostate cancer, which is conducted by the Center for Prostate Disease Research (CPDR); breast cancer research, conducted by the Clinical Breast Care Project; and, research in the Immunology Program, which is on-going in the Cancer Vaccine Development Laboratory. Other programs focus on soft-tissue sarcoma and gynecologic oncology. The members of these teams are basic and clinical scientists from a number of specialty areas. A significant number of the key leaders in the USMCI are also members of the Department of Surgery at USU. For example, **John F. Potter, M.D., Professor of Surgery, is the Director of the USMCI and a member of the USU SOM Department of Surgery. Colonel David Burris, MC, USA, Associate Professor and Interim Chair, USU SOM Department of Surgery,** is an active participant with the USMCI. And, **Colonels David McLeod and David Jones, the Co-Directors of the Center for Prostate Disease Research (CPDR), are also Professors in the USU SOM Department of Surgery**. In addition, **Colonel Craig Shriver, Director of the Clinical Breast Care Project (CBCP)** and **Lieutenant Colonel George Peoples, Director of the Immunology Program, are members of the USU SOM Department of Surgery**. Other members of the USMCI who also **belong to the USU SOM Department of Surgery are: Commander Ralph Jones; Colonel Michael Marohn, USAF, MC, Associate Professor of Surgery; Colonel (Retired) David Wherry, M.D., Professor of**

Surgery; Colonel John Casler; CAPT Peter Soballe, MC, USN, Assistant Professor of Surgery; and, Major Alexander Stojadinovic. Thus, the Department of Surgery plays a significant collaborative role with the USMCI.

(See pages 98, 104,105, 160, 166, and 167 in the 2002 Edition of the USU Journal for additional information on the Department of Surgery.)

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The Graduate School of Nursing.

Faye Glenn Abdellah, Ed.D., Sc.D., RN, FAAN, Professor and Founding Dean Emerita, was inducted into the Douglass Society of Douglass College on April 10, 2002. The Society is the college's highest honor for its most distinguished graduates. Douglas College, the women's college for Rutgers University located in New Brunswick, New Jersey, recognized Doctor Abdellah for her pioneering work in nursing research, long-term care policies, home health and hospice services, as well as for her leadership as the Founding Dean of the USU Graduate School of Nursing.

Lieutenant Colonel Paul Austin, Ph.D., CRNA, USAF, NC, Assistant Professor, USU GSN, was named as the Chief Consultant to the United States Air Force Surgeon General for Nurse Anesthesia during August of 2002.

CAPT Cynthia Cappello, MS, CRNA, NC, USN, Assistant Professor, USU GSN, was the invited Keynote Speaker for the 2002 Graduation Ceremony, Navy Nurse Corps Nurse Anesthesia Program.

Christine Engstrom, MS, APRN, BC, AOCN, Assistant Professor, VA/DoD Distance Learning Program for Adult Nurse Practitioners, is both a Nurse Practitioner and a Clinical Nurse Specialist in Primary Care and Oncology. Her areas of interest are primarily in prostate cancer treatments and the quality of life of cancer patients. Her most recent publications include: *Clinical and Cost Outcomes Using an Algorithm for the Management of Chemotherapy Induced Nausea and Vomiting,* Measuring Patient Outcomes: A Primer, (2000) Chapter 14, In Eds. Nolan & Mock, Sage Publications, Inc., pages 197-206; and, *Docetaxel Followed by Hormone Therapy after Failure of Definitive Treatments for Clinically Localized/Locally Advanced Prostate Cancer: Preliminary Results,* Seminars in Oncology, (2001) (28), 4, pages 22-31. She maintains a clinical practice with prostate cancer patients.

Lieutenant Colonel Karen Gausman, MSN, AN, USA, Assistant Professor and Commandant, USU GSN, is Board Certified by the American Nurses Credentialing Center in Nursing Administration, Advanced. LTC Gausman was honored with the Order of Military Medical Merit in 2002, selected for promotion to Colonel (0-6), and was designated as eligible to apply for the United States Army War College Distance Education Program. In addition to her military accomplishments, she completed the

Marine Corps Marathon during 2002.

Cynthia Grandjean, Ph.D., CRNP, Assistant Professor, USU GSN, focuses her research on health issues of particular relevance to geriatric patients. She just completed her doctoral studies at the University of Maryland, College Park, investigating the impact of religious coping on the psychological well-being of older individuals. One of her main research interests is on the importance of spirituality with regard to health promotion. The Army has developed a conceptual model for soldier and family wellness, which includes spirituality as a key element. Doctor Grandjean was a Co-Investigator on a research project conducted at The Catholic University of America, investigating spiritual well-being and the quality of life in persons with chronic illnesses. Doctor Grandjean also has an interest in the impact of sleep disturbances on the health of older individuals. This is of particular importance to the Military Health System following the institution of TRICARE for Life. More than 50 million people suffer from one of 80 sleep disorders and two-thirds of all Americans complain of sleep deprivation. Sleep disturbances afflict more than 50 percent of adults over the age of 65 who live at home and approximately two-thirds of those who live in institutions. The topic of assessment and management of sleep disorders in geriatrics was addressed in an article published in The Nurse Practitioner by Doctor Grandjean and Ms. Susanne Gibbons.

Lieutenant Colonel Marjorie Graziano, MSN, CRNP, USAF, NC (Retired), Assistant Professor, USU GSN, retired in September of 2002 and smoothly transitioned into the civilian role as a full time faculty member. In addition to her teaching responsibilities, she coordinates the Post Masters student experiences in the GSN.

Debra G. Howes, RN, MSN, ANP, Assistant Professor, VA/DoD Distance Learning Program for Adult Nurse Practitioners, joined the GSN faculty in 2002. She was in the first class to graduate from the VA/DoD Distance Learning Program for Adult Nurse Practitioners at USU. She graduated from Catholic University with a Master Degree in Nursing as a Cardiovascular Clinical Specialist. In addition to her faculty position at USU, she maintains her clinical practice at the Baltimore Veterans Administration Medical Center as a Cardiology Nurse Practitioner in the Cardiology, Pacemaker and ICD Clinics. Her interests include cardiovascular disease and women, women with depression and cardiovascular disease, quality of life of spouses with ICDs and lipid management.

Lieutenant Colonel Douglas G. Jackson, USA, MN, MS Health Administration, CRNP, Assistant Professor, USU GSN, joined the GSN faculty in February of 2002, transitioning to USU from a senior fellowship position in the office of United States Senator Daniel K. Inouye of Hawaii. LTC Jackson brought with him an understanding of the political forces influencing health care and has offered the GSN invaluable insights into the future of Nurse Practitioners and Federal Healthcare Systems. He has directed his efforts for improvements in curriculum and clinical experiences for the GSN during this past year. He played a critical role in developing a curriculum structure that will serve to provide guidance for faculty to plan and organize their programs of instruction and research. He was also invited to review a new publication on Disaster Nursing and Emergency Preparedness by the Springer Publishing Company.

Major (Promotable) Reynold Mosier, MSN, CRNP, AN, USA, Assistant Professor, USU GSN, arrived in June of 2002. Major Mosier has over 12 years of Nurse Practitioner experience, having practiced both as an Adult Nurse Practitioner and as a Family Nurse Practitioner (FNP). Major Mosier co-coordinated the foundational *Primary Care of the Adult Course* and has been actively engaged in restructuring FNP student experiences in operational environments. Through his collaborative efforts with the USU SOM Department of Military and Emergency Medicine during 2002, for the first time, GSN students joined the USU SOM students and completed the *Military Contingency Medicine Course*, to include attending *Bushmaster*, a week-long medical training field exercise unique to USU graduates.

Angela C. Martin, MSN, FNP, CS-P, Assistant Professor and Associate Director of the VA/DoD Distance Learning Program for Adult Nurse Practitioners, joined the USU faculty in 1998. Her area of expertise includes past experience as the Director of a Family Nurse Practitioner Program and the Director of a state-wide distance-learning program for Family Nurse Practitioners. Her areas of interest include: integrating mental health prevention programs into primary care settings and understanding the role of parenting and children's mental health. This past year (2002), Ms. Martin published an article, *It's Never Too Late to Start: Seven Steps to Promote Patients' Health*, in Topics in Advanced Nursing Practice, a peer-reviewed electronic journal. In addition, she authored a book chapter, *Psychosocial Health Concerns*, in E.Q. Youngkin & M.S. Davis (Eds.), Women's Health: A Primary Care Clinical Guide, New Jersey, Prentice Hall - due to be published in 2003. She is prepared clinically as a Psychiatric Clinical Nurse Specialist and as a Family Nurse Practitioner; her background in primary care assists in her understanding the interaction between biology and psychosocial issues in patient care. She has been accepted in a Ph.D. program at the Hattie R. Rosenthal College of Psychoanalysis and plans to complete her degree over the next several years. She is also an Advanced Candidate at the Washington Psychoanalytic Institute in Washington, D.C.

Diane Padden, MSN, CRNP, Assistant Professor, USU GSN, continues to focus her studies on the use of standardized patients in educating advanced practice nurses in collaboration with the National Capital Area Simulation Center. In April of 2002, Ms. Padden, along with **Diane Seibert, Ph.D.**, and **Graceanne Adamo, MA, CMA,** presented a workshop at the 28th Annual Meeting of the National Organization for Nurse Practitioners entitled, *Resolving Ambiguity in the Assessment of Clinical Skills*. Subsequently, they were invited to contribute to a monograph entitled, *Advancing New Paradigms in Nurse Practitioner Education*. An article entitled, *Using Standardized Patients to Resolve Ambiguity in Clinical Assessment Skills*, was accepted for publication in the monograph to be released in February of 2003. Ms. Padden will present a poster on *Comparing Methods for Clinical Evaluation of Advanced Practice Nursing Students* at the National Organization for Nurse Practitioner Faculties Annual Meeting in April of 2003 in Philadelphia, Pennsylvania. This year, Ms. Padden was a contributing author to a book entitled, Telephone Triage Protocols in Obstetrics and Gynecology.

Lieutenant Colonel Cheryl A. Reilly, MSN, CNOR, CNA, BC, USAF, NC, Assistant Professor, USU GSN, Perioperative Clinical Nurse Specialist Program, recently joined the GSN faculty in November of 2002. Prior to joining the USU nursing faculty, LtCol Reilly taught Nursing Service Management at the 882nd Training Group, Sheppard Air Force Base, Texas. LtCol Reilly mentored and taught over 100 Air Force Nurse Corps officers leadership and management skills necessary for success in their first supervisory positions. In addition to teaching leadership and management skills,

she taught over 200 students basic computer skills and authored a computer guide for Jet Form's Form Flow and Microsoft Word, Excel, and PowerPoint. LtCol Reilly also brings with her over 21 years of perioperative nursing experience. Along with LTC (promotable) Wanzer, LtCol Reilly is actively involved in developing the new Perioperative Clinical Nurse Specialist Program, which will provide unique and exciting experiences for the GSN students.

Lieutenant Colonel Richard Ricciardi, MSN, AN, USA, was reassigned from the GSN in June of 2002, to the Kimbrough Ambulatory Care Center at Fort Meade, Maryland. He was appointed to serve as Director of Outpatient Clinical Services. LTC Ricciardi was recently selected for promotion to Colonel (0-6) and will be returning to USU in the Fall of 2003 as a Ph.D. candidate in the GSN.

Donald D. Rigamonti, Ph.D., Associate Professor, USU GSN, was one of three finalists for the American Association of Nurse Anesthetists' Golden Apple Award for Education, presented at the Assembly of School Faculty Meeting during the Spring of 2002.

Colonel Sarah Wrenn, Ph.D., CRNP, USAF, NC, Assistant Professor, USU GSN, recently joined the GSN faculty in the Fall of 2002. Prior to her arrival, Colonel Wrenn served as a pediatric nurse practitioner and nurse researcher at the Wilford Hall Medical Center, where her research was directed toward children with chronic diseases. Colonel Wrenn was the Study Coordinator and Associate Investigator on a multi-site study entitled, *An Open Label Randomized Trial with Tobramycin Solution for Inhalation (TOBI) in Cystic Fibrosis Patients with Mild Lung Disease*, sponsored by the CHIRON Corporation. And, she was the Co-Principal Investigator on an epidemiology study on children with Type 2 Diabetes entitled, *Prevalence of Type 2 Diabetes Mellitus in At- Risk Children and Adolescents in a Military Population*. Colonel Wrenn served as a Foundation Board Member of the National Association of Pediatric Nurse Associates and Practitioners (NAPNAP) and as a member of the Research Committee, responsible for reviewing NAPNAP-sponsored grants.

RESEARCH AREAS AND INTERESTS

Alison O'Brien, Ph.D.
Professor and Chair / Department of Microbiology and Immunology

I. Description of projects, how areas impact public health, military medical relevance, key words

A. Overview: Dr. O'Brien's major interest is in the pathogenesis of bacterial infections. Specifically, her laboratory investigates the virulence mechanisms of *E. coli* O157:H7 and other Shiga toxin-producing *E. coli* and the contribution of the Rho-modifying Cytotoxic Necrotizing Factor (CNF) to urinary tract infections and prostatitis caused by uropathogenic *E. coli*. Her most recently awarded a grant for the development of immunoprotective monoclonal antibodies (MAbs) against *Bacillus anthracis* spores.

B. Pathogenicity of Shiga toxin-producing *E. coli*: Shiga toxin-producing *E. coli* (STEC) cause food- and water-borne outbreaks and sporadic cases of intestinal disease manifest as diarrhea, and/or bloody diarrhea (hemorrhagic colitis, HC). About 5-10% of children infected with STEC can subsequently develop a life-threatening kidney dysfunction called the hemolytic uremic syndrome (HUS). Two important virulence factors associated with many STEC strains are the Shiga toxins (Stxs) and the adhesin, intimin. The long-term objectives of this project are to define the pathogenic mechanisms by which STEC cause disease and to develop strategies for the prevention and treatment of STEC-mediated hemolytic uremic syndrome (HUS). *E. coli* O157:H7 has the potential to simultaneously infect large numbers of people who ingest as few as 100 organisms in common source food- or water-borne outbreaks (example, the July 1996 outbreak in Japan that affected ~10,000 people). In addition, the rate of secondary transmission of *E. coli* O157:H7 is high. Therefore, large-scale infection of soldiers with *E. coli* O157:H7 or another Shiga-toxin producing *E. coli* isolate would likely result in an incapacitating illness among troops. Furthermore, Shiga toxin and other Stx family members are considered potential biological warfare/terrorist threats as indicated by the CDC-mandated restrictions on shipment of Stxs and Stx-expressing clones

C. Cytotoxic necrotizing factor type 1: (CNF1) is a member of a family of bacterial toxins that target the Rho family of small GTP-binding proteins in mammalian cells. CNF1 deamidates a single glutamine residue in RhoA, Cdc42, and Rac1, but not in Ras. This deamidation results in the constitutive activation of these GTPases, which can trigger actin stress fiber formation, multinucleation, or cell death, depending on the target cell and dose of toxin. CNF1 is frequently produced by *Escherichia coli* strains that cause urinary tract infections (UTIs) such as cystitis, prostatitis, and pyelonephritis. In support of this epidemiological connection, Dr. O'Brien's group recently showed that CNF1 not only induces apoptosis in human uroepithelial cells but also provides a growth advantage to uropathogenic *E. coli* (UPEC) in a mouse model of ascending UTI when compared to CNF1-negative isogenic mutants. Additionally, Dr. O'Brien and colleagues found that CNF1 enhances the degree of inflammation and resulting tissue damage in bladders of infected mice and in prostates of rats challenged intraurethrally with CNF1-producing UPEC and that CNF1-producing UPEC survive better than CNF1-negative isogenic mutants in the presence of human polymorphonuclear leukocytes (PMNs). Taken together, these findings led to the following hypothesis. CNF1 enhances the pathogenicity of UPEC by: i.) promoting uroepithelial cell shedding; ii.) evoking a large influx of PMNs while providing toxin-producing *E. coli* protection against PMN-mediated killing, and; iii.) facilitating deeper invasion of the bladder or prostate by the infecting strain. The long-term objectives of this project are to test this theory. Urinary tract

infections (UTIs), of which more than 80% are caused by *E. coli*, are among the most common types of bacterial disease in adults. Women are much more likely to have UTIs than are men, a gender disparity that is believed to result from the shorter female urethra. Indeed, as many as 20% of all women have at least one episode of a UTI in their lifetime, and recurrent UTIs affect approximately 1 in 10 women in the United States. Thus, UTIs, which include infections of the bladder (cystitis) and kidney (pyelonephritis), are a significant source of morbidity among women in the military.

D. Immunoprotective monoclonals to *B. anthracis* spores: *Bacillus anthracis* spores were recently used as agents of bioterrorism. Among the many negative consequences of these deliberate instances of microbiological sabotage was one positive outcome: not all of the 11 victims with the typically lethal inhalational form of anthrax died. Indeed, the aggressive use of quinolones and other antibiotics coupled with the early recognition of disease resulted in the survival of 6 of the 11 patients. Unfortunately, hundreds of other individuals potentially exposed to the anthrax spores required an extended course of antibiotic therapy. A remaining health concern is that the people who received antibiotic prophylaxis may still present with inhalational anthrax after conclusion of their therapy as dormant viable spores germinate. One way to increase the likelihood that patients with disease will survive and that those exposed will have a higher probability of remaining healthy is to prevent the infectious dormant spores from germinating and subsequently transforming to vegetative cells. Recent evidence that antibodies against the protective antigen (PA; the shared B subunit for the two A subunit toxins of *B. anthracis,* edema factor and lethal factor) actually bind to the surface of spores and decrease the level of spore germination, taken with the fact that formaldehyde-inactivated spores can serve as a protective vaccine against anthrax in guinea pigs, led us to the following hypothesis. Monoclonal antibodies (MAbs) against PA and/or other spore-surface-expressed antigens can block spore germination or render spores more susceptible to phagocytosis and ultimately killing by macrophages. Based on this theory, our goals are to develop immunoprotective MAbs against *B. anthracis* spores that confer protection against anthrax in animal models. Ultimately, we intend to humanize those MAbs for use as short-term preventative agents or therapeutic modalities.

II. Publications (and manuscripts in press) within last 24 months

Peer-reviewed primary publications

1. Kokai-Kun, J.F., A.R. Melton-Celsa, and A.D. O'Brien. 2000. Elastase in intestinal mucus enhances the cytotoxicity of Shiga toxin type 2d. J. Biol. Chem. 275: 3713-3721.

2. Dean-Nystrom, E.A., J.F.L. Pohlenz, H.W. Moon, and A.D. O'Brien. 2000. *Escherichia coli* O157:H7 causes more severe systemic disease in suckling piglets than in colostrum-deprived neonatal piglets. Infect. Immun. 68: 2356-2358.

3. Mills, M., K. C. Meysick, and A. D. O'Brien. 2000. Cytotoxic Necrotizing Factor Type 1 of Uropathogenic *Escherichia coli* Kills Cultured Human Uroepithelial 5637 Cells by an Apoptotic Mechanism. Infect. Immun. 68: 5869-5880.

4. Ikeda, J. S., C. K. Schmitt, S.C. Darnell, P. R. Watson, J. Bispham, T.S. Wallis, D. L. Weinstein, E. S. Metcalf, P. Adams, C. D. O'Connor, and A. D. O'Brien. 2001. Flagellar phase variation of *Salmonella enterica* ser. Typhimurium contributes to virulence in the

murine typhoid infection but does not influence *Salmonella*-induced enteropathogenesis. Infect. Immun. 69: 3021-3030.

5. Gewirtz, A.T., P.O. Simon, Jr., C.K. Schmitt, L.J. Taylor, C.H. Hagedorn, A.D. O'Brien., A.S. Neish, and J.L. Madara. 2001. Salmonella typhimurium translocates flagellin across intestinal epithelia, inducing a proinflammatory response. J. Clin. Invest. 107: 99-109.

6. Meysick, K. C., M. Mills and A. D. O'Brien. 2001. Epitope mapping of monoclonal antibodies capable of neutralizing Cytotoxic Necrotizing Factor Type 1 of uropathogenic *Escherichia coli*. Infect. Immun. 69: 2066-2074.

7. Rippere-Lampe, Karen E., Alison D. O'Brien, Richard Conran, and Hank A. Lockman. 2001. Mutation of the gene encoding Cytotoxic Necrotizing Factor type 1 (*cnf1*) attenuates the virulence of uropathogenic *E. coli*. Infect. Immun. 69: 3954-3964

8. Schmitt, C.K, J.S. Ikeda, S.C. Darnell, P.R. Watson, J. Bispham, T.S. Wallis, D.L. Weinstein, E.S. Metcalf, and A.D. O'Brien. 2001. Absence of all components of the flagella export and synthesis machinery differentially alters virulence of *Salmonella enterica* serovar Typhimurium in models of typhoid fever, survival in macrophages, tissue culture invasiveness, and calf enterocolitis. Infect. Immun. 69: 5619-5625

9. Rippere-Lampe, K.E., M.Lang, H. Ceri, M. Olson, H.A. Lockman, and A.D. O'Brien. 2001. Cytotoxic necrotizing factor type 1-positive*Escherichai coli* cause increased inflammation and tissue damage to the prostate in a rat prostatitis model. Infect. Immun. 69: 6515-6519

10. Melton-Celsa, A.R., J.F. Kokai-Kun, and A.D. O'Brien. 2002. Activation of Shiga-toxin type 2d (Stx2d) by elastase involves cleavage of C-terminal two amino acids of the Stx2d A_2 peptide in the context of the appropriate B pentamer. Mol. Micro. 43:207-215.

11. Woods, J.B., C.K. Schmitt, and A.D. O'Brien. 2002. Ferrets as a model system for renal disease secondary to intestinal infection with *Escherichia coli* O157:H7 and other Shiga-toxin producing *Escherichia coli*. J. Infect. Dis. 185: 550-554.

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Reviews and invited papers and chapters

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19. Melton-Celsa, A.R., and **A.D. O'Brien**. 2000. Shiga toxins of *Shigella dysenteriae* and *Escherichia coli*. p. 385-406. *In* K. Aktories (ed.), Bacterial Protein Toxins Handbook of Experimental Pharmacology, Vol. 145. Springer-Verlag Berlin.

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RESEARCH AREAS AND INTERESTS

Christopher C. Broder, Ph.D.
Associate Professor / Department of Microbiology and Immunology

I. Description of projects, how areas impact public health, military medical relevance, key words

A. Overview: The major focus of Dr. Broder's research is the structural and functional analyses on the interactions between enveloped viruses and their cellular receptors. Human immunodeficiency virus (HIV) and new emerging paramyxovirus agents are the two main areas of Dr. Broder's present research work. He, with Dr. Gerald Quinnan as the PI, received funding for a coveted program project grant from NIH, a first for this University.

B. HIV entry: The goals of his work are to identify the steps and requirements of viral envelope glycoprotein (Env)-mediated membrane fusion, the determinants of viral tropism, the discovery of new viral receptors, and the mechanism of Env-mediated fusion. A detailed understanding of these processes will lead to the discovery of new methods of intervention. Current work on HIV-1 includes the Env-mediated fusion mechanism and its interaction with CD4 and coreceptors. The HIV-1 Env serves two functions that are critical in the replication cycle of the virus: binding to host cells and mediating membrane fusion through what is believed to be receptor induced conformational alterations in its structure. In earlier work he identified two distinct cofactors (CXCR4/CCR5) for HIV-1 Env-mediated fusion and virus infection. These molecules are members of the chemokine receptor superfamily, and are now recognized as actual coreceptors for HIV-1 and they influence both the species and cell-type tropism of the virus. His laboratory is engaged in an extensive analysis of the roles these coreceptors play in the fusion process on the molecular level, and what role they may play in HIV-1 pathogenesis. In addition, his group is interested in the structure of these viral envelope glycoproteins with particular emphasis on the immunological characteristics of the native glycoproteins. His laboratory has carried out an extensive analysis of the antigenic structure of native oligomeric Env and use of oligomeric Env preparations as a vaccine immunogen, otherwise known as gp140. Ongoing research work includes the analysis of HIV-1 primary isolate-derived oligomeric gp140 preparations from a host of alternate HIV-1 clades, including a variety of genetically modified versions of the proteins with the goal of enhancing a neutralizing antibody response when used in small animals. In addition, in collaboration with other laboratories at USUHS they are pursuing novel prime-boost HIV-1 vaccination strategies, with particular HIV-1 isolate Env proteins, using Venezuelan Equine Encephalitis (VEE) replicons and soluble oligomeric gp140 immunogen preparations in small animals and non-human primates.

C. Hendra virus and Nipah viruses: The second area of work is the investigation Hendra virus and Nipah virus, which are newly emerging and highly lethal zoonotic agents. These studies are in collaboration with several scientists located at the Australian Animal Health Laboratory, Geelong, Australia. Both viruses are new members of the *Paramyxoviridae* and are now the prototypic members of a new Genus, Henipahvirus. They are related to the Morbilliviruses, of which Human Measles virus is a member, yet they are uniquely distinct from all other known Paramyxoviruses, both on the genomic molecular level as well as their biological, species tropism characteristics. Both viruses are classified as zoonotic BSL-4 agents. Hendra virus emerged in 1994, and was isolated from fatal cases of respiratory disease in horses and humans. Later in 1998-1999, an outbreak of severe encephalitis in people with close contact exposure to pigs in Malaysia and Singapore occurred. In all, more than 276 cases of encephalitis, including 106 deaths, had been

reported a near 40% fatality rate upon infection. Pigs appeared to be an amplifier of the Nipah virus, and these viruses can also be economically devastating: over 1.2 million pigs were slaughtered to stem the Nipah virus outbreak. They appear to infect through the respiratory system initially and are capable of causing viremia. Hendra and Nipah both have broad species tropism, which is unusual because most paramyxoviruses are species restricted and do not have other reservoirs in nature. The potential to be weaponized and used as biological warfare agents is clearly possible. They may be amplified in cell culture or embryonated chicken eggs, and could be used as a terror weapon targeting humans as well as livestock, the later which would serve as virus amplifiers. Recent evidence has also indicated that nosocomial transmissibility of Nipah virus from patients with encephalitis to healthcare workers is also possible. There are no existing antiviral therapies effective against these viruses, and the only therapies in existence to any viruses in the paramyxovirus family are live-attenuated vaccines. Dr. Broder's group has developed recombinant systems to study the attachment and membrane fusion-entry mechanisms of these viruses, and have developed novel reagents which may serve as potential vaccines as well as those that can specifically block virus infection and spread. He is also engaged in recombinant virus-like particle formation and assembly for reagent development and to understand the requirements of particle formation in these novel viral agents.

II. Publications (and manuscripts in press) within last 24 months

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5. Stantchev, T.S. and **C.C. Broder**. Consistent and Significant Beta-chemokine Inhibition of HIV-1 Envelope-mediated Membrane Fusion in Primary Macrophages. J Infect Dis. 182:68-78. 2000.

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10. Moulard, M., Phogat, S., Shu, Y., Labrijn, A.F., Xiao, X., Binley, J.M., Zhang, M.-Y., Sidorov, I.A., **Broder, C.C.**, Robinson, J., Parren, P., Burton, D.R. and Dimitrov, D.S. Novel Broadly Cross-Reactive HIV-1 Neutralizing Human Monoclonal Fab Selected for Binding to gp120-CD4-CCR5 Complexes. Proc. Natl. Acad. Sci. 99:6913-6918, 2002.

11. Chow, Y-H. , Wei, O.L., Phogat, S., Sidorov, I.A., Fouts, T.R, **Broder, C.C.**, Dimitrov, D.S. Conserved Structures Exposed in HIV-1 Envelope Glycoproteins Stabilized by Flexible Linkers as Potent Entry Inhibitors and Potential Immunogens. Biochemistry. 41:7176-82. 2002.

12. Gallina, A., Mandel, R., Trahey, M., **Broder, C.C.** and Ryser, H.J. Inhibitors of protein disulfide isomerase (PDI) prevent cleavage of disulfide bonds in receptor-bound gp120 and prevent HIV-1 entry. J Biol Chem. Sep 5, in press, 2002.

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RESEARCH AREAS AND INTERESTS

William C. Gause, Ph.D.,
Professor and Vice Chair / Department of Microbiology and Immunology

I. Description of projects, how areas impact public health, military medical relevance, key words

Overview: Dr. Gause's research involves the study of T cell differentiation during infectious disease. His work focuses on the T cell immune response triggered by infection with parasites, particularly intestinal nematode parasites. Chronic malnutrition induced by infection with gastrointestinal parasites causes great morbidity and increased susceptibility to infectious agents. With over 1 billion people currently infected with intestinal nematode parasites, this is a major world health problem. Immunological intervention may promote control in situations where gastrointestinal parasitism is endemic and intractable. The T cell response that develops following intestinal nematode infection (the T helper 2 response) is qualitatively different than T cell responses that occur to many bacteria and viruses (the T helper 1 response). In fact cytokines associated with the T helper 2 (Th2) response can downregulate the Th1 response and vice versa. Dr. Gause's research examines the mechanisms that lead to the development of the Th2 versus the Th1 immune response at the initiation of infection when naïve T cells develop into effector and memory T helper cells. Understanding these mechanisms should provide information required to manipulate the development of the immune response so that a protective response is favored against particular infectious agents. Such knowledge can be used to develop novel immunotherapies and for the creation of the next generation of vaccines. Also, Dr. Gause is characterizing the conserved microbial structures produced by certain nematode parasites that trigger a potent Th2 immune response. The host has evolved to use these parasite structures to rapidly recognize invading parasites and to respond with an appropriate host-protective Th2 response. These microbial structures have the potential for use in immunotherapies to promote host protective Th2 responses and also to act as anti-inflammatory agents during Th1 responses to bacteria and viruses: some of the most harmful effects elicited by bacteria and viruses result from a pathologic inflammatory response. The study and elucidation of the early events that lead to a Th2 response is of obvious medical significance to both military and civilian sectors.

II. Publications (and manuscripts in press) within last 24 months

1. Urban, J., H. Fang, Q. Liu, M.J. Ekkens, S.J. Chen, D. Nguyen, V. Mitro, D.D. Donaldson, C. Byrd, R. Peach, S.C. Morris, F.D. Finkelman, L. Schopf, and **W.C. Gause**. 2000. IL-13-mediated worm expulsion is B7 independent and IFN-gamma sensitive. J. Immunol 15:164: 4250-4256.

2. Morris, S.C., **W.C. Gause**, and F.D. Finkelman. 2000. IL-4 suppression of in vivo T cell activation and antibody production. J. Immunol. 164:1734-40, 2000.

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5. **Gause, W.C.**, V. Mitro, and M. Ekkens. 2000. Regulation of the development of the type 2 immune response. Recent Research Developments in Immunology 2:131-140.

6. Snapper, C.M., Y. Shen, A.Q. Khan, J. Colino, P. Zelazowski, J.J. Mond, W.C. Gause, and Z-Q. Wu. 2001. Distinct types of T-cell help for the induction of a humoral immune response to Streptococcus pneumoniae. Trends in Immunology (formerly Immunology Today). 22: 308.

7. Hanson, S.J., **W. Gause**, and B. Natelson. 2001. Detection of Immunologically Significant Factors for Chronic Fatigue Syndrome Using Neural-Network Classifiers. Clin. Diagn. Lab. Immunol. 8: 658-662.

8. Jankovic, D., Z. Liu, and **W.C. Gause**. 2001. Th1- and Th2-cell commitment during infectious disease: asymmetry in divergent pathways. Trends Immunol. 22(8): 450.

9. Ekkens, MJ, Z. Liu, Q. Liu, A. Foster, J. Whitmire, J. Pesce, AH Sharpe, JF Urban and **W.C. Gause.** Memory Th2 effector cells can develop in the absence of B7-1/B7-2, CD28 interactions, and effector T helper cells after priming with an intestinal nematode parasite. J. Immunol. 168:6344-51, 2002.

10. Lang, TJ, P. Nguyen, R. Peach, **W.C. Gause,** and C.S. Via. In vivo CD86 blockade inhibits CD4+ T Cell activation, Whereas CD80 blockade potentiates CD8+ T cell activation and CTL effector function. J Immunol 168: 3786-3792, 2002.

11. Madden, K.B., L. Whitman, C. Sullivan, **W.C. Gause**, J.F. Urban, Jr., I.M. Katona, F.D. Finkelman, and T. Shea-Donohue. Role of Stat6 and mast cells in IL-4- and IL-13-induced alterations in murine intestinal epithelial cell function. J. Immunol. 169:4417-4422, 2002.

12. Liu, Z., Q. Liu, J. Pesce, J. Whitmire, M.J. Ekkens, A. Foster, J. VanNoy, A.H. Sharpe, J.F. Urban, Jr, and **W.C. Gause.** N. brasiliensis can induce B7-independent Ag-specific development of IL-4-producing T cells from naïve CD4 T cells in vivo J. Immunol.(in press)

13. Ekkens, M.J., Z. Liu, Q. Liu, J. Whitmire, S. Xiao, A. Foster, J. Pesce, J. VanNoy, A.H. Sharpe, J.F. Urban, and **W.C. Gause**. The role of OX40L interactions in the development of the Th2 response to the gastrointestinal nematode parasite Heligmosomoides polygyrus. J. Immunol. (in press).

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RESEARCH AREAS AND INTERESTS

Chou-Zen Giam, Ph.D.
Professor / Department of Microbiology and Immunology

I. Description of projects, how areas impact public health, military medical relevance, key words

Overview: Dr. Giam's research concerns the molecular biology of human retroviruses: HTLV-I and HIV, and the Kaposi's sarcoma associated herpesvirus (KSHV/HHV8), with a special focus on viral regulatory proteins and their interaction with cellular transcription factors or signaling molecules. The diseases caused by the human T-lymphotropic virus type I (HTLV-I): adult T-cell leukemia (ATL) and tropical spastic paraparesis/HTLV-I associated myelopathy (HAM/TSP), have their etiologies in the dysregulated proliferation of T-cells. HTLV-I encodes a critical trans-activator, Tax, which augments HTLV-I viral mRNA transcription greatly and usurps regulatory mechanisms critical for cell activation and division to facilitate viral replication. The ability of Tax to interact with a multitude of cellular factors to effect potent activation of NF-κB, cell cycle perturbation, and cell transformation is thought to be responsible for the clinical outcomes of HTLV-I infection. Research in Dr. Giam's lab focuses on the elucidation of the mechanisms of HTLV-I Tax action.

Research results from Dr. Giam's laboratory indicate that Tax, in essence, functions as a virus-specific adaptor protein that connects the transcriptional co-activators, phospho-CREB binding protein (CBP) or its homologue, p300, and another co-activator called p300-CBP associated factor, P/CAF, to cellular transcription factors, CREB/ATF-1, assembled on the HTLV-I viral transcriptional enhancer. This allows potent HTLV-I viral mRNA transcription to occur. Most recently, Dr. Giam's lab has demonstrated that Tax interacts directly with the Ser/Thr protein phosphatase 2A (PP2A) and inhibits its enzymatic activity. PP2A is a major Ser/Thr protein phosphatase in cells of all eukaryotes, including those of human and yeast. It plays a crucial role in the negative regulation of multiple cellular processes, including the mitogen activated protein (MAP) kinase cascade, the I-κB kinase signaling pathway, the TOR (target of rapamycin) kinase signaling pathway, DNA replication, transcription, cell cycle progression, spindle checkpoint control, and others. The allosteric inhibition of PP2A and/or the alteration of its functions by Tax is likely to play a significant role in the ability of Tax to impact on multiple cellular regulatory processes. Current efforts in Dr. Giam's lab are directed towards elucidating the role of Tax-PP2A interaction/inhibition in the activation of cellular signal transduction pathways, cell cycle perturbations, and T-cell leukemogenesis.

Finally, the association of a newly discovered human herpesvirus, KSHV/HHV8, with Kaposi's sarcoma is also being investigated by analyzing a series of AIDS-related and endemic KS samples including tumor biopsies and patient sera recruited from Uganda. The major emphasis for this project is on genes important for KSHV/HHV8 transcription, viral re-activation from latency, and KS tumorigenesis.

The discovery that Tax is a non-competitive inhibitor of the major serine/threonine protein phosphatase 2A is likely to yield fundamental insights into the following three areas—(1) mechanisms via which HTLV-I usurps cellular signaling processes for viral replication; (2) the control of cell cycle progression and its perturbation by Tax; and (3) the molecular events that lead to T-cell transormation/leukemogenesis.

II. Publications (and manuscripts in press) within last 24 months

1. Harrod, R., Kuo, Y.-L., Tang, Y., Yao, Y., Vassilev, A., Nakatani, Y., and Giam, C.-Z p300 and p300/cAMP-responsive Element-binding Protein Associated Factor Interact with Human T-cell Lymphotropic Virus Type-1 Tax in a Multi-histone Acetyltransferase/Activator-Enhancer Complex. J Biol Chem, 275: 11852-11857, 2000

2. Remick, S.C., Patnaik, M. Ziran, N. M., Liegmann, K. R., Dong, J., Dowlati, A, Yao, Y., Chandran, B., Abdul-Karim, F. W., Giam, C.-Z. Human herpesvirus-8-associated disseminated angiosarcoma in an HIV-seronegative woman: report of a case and limited case-control virologic study in vascular tumors. Am J Med. 2000 Jun 1;108(8):660-4.

3. Kuo, Y.-L., Tang, Y., Harrod, R., Cai, P., and Giam, C.-Z. Kinase-inducible domain-like region of HTLV type 1 tax is important for NF-kappaB activation. AIDS Res Hum Retroviruses. 2000 Nov 1;16(16):1607-12.

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6. Fu, D., Kuo Y-L., Jeang, K-T., and Giam, C-Z. Human T-lymphotropic Virus Type I Transactivator Tax activates I-kB Kinase by Inhibiting I-kB Kinase γ Subunit-Associated Serine/Threonine Protein Phosphatase 2A (JBC, in press)

7. Liao W., Tang Y., Lin S-F., Kung H-J., and Giam C-Z., K-bZIP of Kaposi's Sarcoma-Associated Herpesvirus/Human Herpesvirus type 8 (KSHV/HHV-8) Binds KSHV/HHV-8 Rta and Represses Rta-Mediated Trans-activation (J.Virol, in revision).

8. Kuo, Y-L., Wang, L-C., Tang, Y., Fu, D., Harrod, R., Kung, H-J., Shih, H-M., and Giam, C-Z. Human T-lymphotropic Virus Type I Transactivator Tax is a Noncompetitive Inhibitor of Serine/Threonine Protein Phosphatase 2A (submitted)

9. Liu, B., Liang, M., Kuo, Y-L, Liao, W., Boros, I., Kleinberger, T., Blancato, J., and Giam, C-Z HTLV-1 Oncoprotein Tax Promotes Aberrant Degradation of Pds1p/Securin and Clb2p/Cyclin B1, Causing Chromosomal Instability (submitted)

10. Liao, W., Liao W., Tang Y., Xu C-J., and Giam C-Z., Kaposi's Sarcoma-asociated Virus /Human Herpes Virus Type 8 Immediate Early Transcriptional Activator, Rta, is an Oligomeric Sequence-Specific DNA Binding Protein (in preparation).

RESEARCH AREAS AND INTERESTS

Ann Jerse, Ph.D.
Assistant Professor / Department of Microbiology and Immunology

I. Description of projects, how areas impact public health, military medical relevance, key words

Overview: The major research interest of Dr. Jerse's laboratory centers on the mechanisms by which *Neisseria gonorrhoeae* adapts to the female genital tract. The primary research tool that Dr. Jerse and her staff utilize to address this question is a female mouse model of gonococcal genital tract infection that was developed in Dr. Jerse's laboratory. Dr. Jerse's research group currently uses this model to study the role of selected gonococcal virulence factors in infection, including catalase, nitrite reductase, sialyltransferase, the hemoglobin receptor, and phase variable outer membrane proteins. Dr. Jerse also utilizes this model to study interactions between *N. gonorrhoeae* and certain commensal flora that have been proposed to protect against gonorrhea. A second research area in Dr. Jerse's laboratory is the development of vaccines and topical microbicides to prevent gonorrhea. Historically, pre-clinical testing of such prophylactic agents was hindered by the absence of a small animal model of infection. Utilizing the mouse model developed in her laboratory, Dr. Jerse and collaborators demonstrated that intranasal immunization of mice with gonococcal outer membranes results in reduced recovery of *N. gonorrhoeae*. Dr. Jerse is currently evaluating other antigens for the capacity to prevent murine genital tract infection. With regard to topical agents designed to prevent gonorrhea, Dr. Jerse and her staff recently showed that transmission of *N. gonorrhoeae* to mice can be blocked by sulfonated and sulfated polymers. Dr. Jerse is currently testing other microbicides for the capacity to prevent gonorrhea in collaboration with Dr. Richard Cone at Johns Hopkins University.

Over 400,000 cases of gonorrhea are reported in the U.S., and an estimated 67 million cases occur world-wide annually. Public health efforts to reduce the incidence of gonorrhea are challenged by the high rate of asymptomatic infection, and the emergence of antibiotic resistant strains. The major morbidity and mortality of gonorrhea is associated with upper reproductive tract infection in females. Over 2 million cases of pelvic inflammatory disease (PID) occur in the U.S. each year, approximately 50% of which is due to *N. gonorrhoeae*. PID is a serious condition that often requires hospitalization. Post-infection complications of PID include ectopic pregnancy, involuntary infertility, and chronic pelvic pain, all of which further contribute to the enormous public health costs of gonorrhea.

Gonorrhea ranks high among infections important to the military, second only to chlamydia among reportable infections. Over 1,500 cases of gonorrhea were reported in the U.S. Army in 1997. Upper reproductive tract infection is a serious form of gonorrhea in both men and women. In one study of a military population, 16% of acute epididymitis was due to *N. gonorrhoeae*. In another study, the rate of ectopic pregnancy (a serious complication of gonococcal and chlamydial salpingitis), was higher among military women than in the U.S. population at large, and equal to the highest recorded rates in the world. The occurrence of ectopic pregnancy among women in remote posts or aboard ships is of special concern in that emergency care might be delayed. Pathogenesis studies performed in Dr. Jerse's laboratory will enhance our understanding of how *N. gonorrhoeae* persists in the genital tract to create a reservoir of infection in the community, and will potentially lead to the identification of virulence factors that could be used in a vaccine. Dr. Jerse's work towards developing a vaccine and topical microbicides against gonorrhea is directly relevant to

reducing the incidence and costs associated with gonorrhea in military personnel and their dependents.

II. Publications (and manuscripts in press) within last 24 months

1. Plante, M. , A.E. Jerse, J. Hamel, F. Coutre, C.R. Rioux, B.R. Brodeur, and D. Martin. 2000. Intranasal immunization with gonococcal outer membrane preparations reduces the duration of vaginal colonization of mice by Neisseria gonorrhoeae. J. Infect. Dis. 182:848-855.

2. Dalal, S.J., J.S. Estep, I.E. Valentin-Bon, and A.E. Jerse. Standardization of the Whitten effect to induce susceptibility to Neisseria gonorrhoeae in female mice. 2001. Contemp. Topics in Lab. Anim. Sci. 40(2):12-16.

3. Zeitlin, L., Hoen, T.E., Achilles S.L., Hegarty, T.A., Jerse, A.E., Kreider J.W., Olmsted S.S., Whaley, K.J., Cone, R.A., and T.R. Moench. 2001. Tests of BufferGel for contraception and prevention of sexually transmitted diseases in animal models. Sex. Transm. Dis. 28:417-423.

4. Ronpirin, C., A.E. Jerse, and C.N. Cornelissen. 2001. Gonococcal genes encoding transferrin-binding proteins A and B are arranged in a bicistronic operon but are subject to differential expression. Infect. Immun. 69:6336-6347.

5. Jerse, A.E., E.T. Crow, A.N. Bordner, I. Rahman, C.N. Cornelissen, T.R. Moench, and K. Mehrazar. 2002. Growth of Neisseria gonorrhoeae in the female mouse genital tract does not require the gonococcal transferrin or hemoglobin receptors and may be enhanced by commensal lactobacilli.Infect. Immun. 70:2549-2558.

RESEARCH AREAS AND INTERESTS

Guangyong Ji, Ph.D.,
Assistant Professor, Department of Microbiology and Immunology

I. Description of projects, how areas impact public health, military medical relevance, key words

Overview: The major research interest in Dr. Guangyong Ji's laboratory is to define the molecular mechanism of staphylococcal pathogenesis. Currently, they focus on the study of peptide-determined autoinduction of virulence gene expression in *Staphylococcus aureus* and the elucidation of the role of this regulation in the pathogenesis of *S. aureus* diseases.

S. aureus is among the most prominent of nosocomial bacterial pathogens, causing a variety of human diseases ranging from superficial abscesses to life-threatening deep infections, such as endocarditis and pneumonia. The problem has become alarming within the last few years due to the increasing resistance of *S. aureus* to all currently available antibiotics, including vancomycin, an antibiotic that is the last effective drug to treat multidrug-resistant *S. aureus* infections. *S. aureus* pathogenicity is multifactorial and involves the production of secreted toxins, enzymes, and cell wall-associated proteins. The expression of most of these virulence factors is regulated by a global regulator which consists of a two-component signal transduction system, a modified autoinducing peptide, and an RNA molecule which is the actual effector of the virulence response. The studies in Dr. Ji's laboratory on the understanding of staphylococcal virulence regulation may lead to the development of new antibacterial drugs that target this regulatory system.

II. Publications (and manuscripts in press) within last 24 months

None

RESEARCH AREAS AND INTERESTS

Susan G. Langreth, Ph.D.
Associate Professor / Department of Microbiology and Immunology

I. Description of projects, how areas impact public health, military medical relevance, key words

Overview: The major focus of Dr. Langreth's research is Unicellular Parasite Pathogenesis. The long term objectives are to understand mechanisms of pathogenesis and immunity in *Plasmodium* and *Pneumocystis* parasites and to identify critical host parasite interactions which may contribute to the development of vaccines or more effective chemotherapy.

The emphasis of the approach is to locate and characterize, by immunocytochemistry and electron microscopy, particular antigens/peptides/expressed gene products in the human malaria parasite *Plasmodium falciparum* and its host erythrocyte. Of particular interest are antigens on the infected erythrocyte surface that may be mediators of cytoadherence and sequestration. Parasite isolates or clones with altered expression of surface components (knob structures, in vitro cytoadherence) are being compared with wild type parasites. Malarial antigens associated with infected erythrocyte cytoplasmic structures (Maurer's clefts, parasitophorous vacuoles, etc.) are also being characterized.

Pneumocystis carinii (Pc) is an opportunistic unicellular pathogen and a major cause of morbidity and mortality in AIDS patients. Dr. Langreth is studying Pc pathogenesis in an immunosuppressed rat model and is engaged in collaborative projects to develop axenic long term culture methods for *Pneumocystis*, using organisms harvested from infected immunosuppressed rats as a source. She is generating methods to harvest and purify the pathogen from rat lung, for cultivation and for biochemical and immunocytochemical analysis. Establishment of a culture for Pc will provide basic information about the parasite's life cycle and nutritional requirements, as well as provide a reliable source of the organisms for chemotherapy and molecular studies.

II. Publications (and manuscripts in press) within last 24 months

None

RESEARCH AREAS AND INTERESTS

Anthony Maurelli, Ph.D.,
Professor / Department of Microbiology and Immunology

I. Description of projects, how areas impact public health, military medical relevance, key words

Overview: The major focus of research in the laboratory of **Dr. Anthony T. Maurelli** is understanding the genetics of bacterial pathogenesis, that is, determining what genes are important for making a bacteria a pathogen and how expression of these genes enables the bacteria to cause disease. Research focuses on two groups of bacteria: *Shigella* spp. and *Chlamydia* spp. Bacteria of the genus *Shigella* are the causative agents of bacillary dysentery (shigellosis). Dysentery is an acute diarrheal disease that has a major impact on public health in developing countries particularly among young children. Even in developed countries, dysentery due to *Shigella* causes significant morbidity each year. For military planners, diarrheal diseases such as dysentery have historically been of particular concern during large-scale deployments. Experience during World War II, the Vietnam War, and the Gulf War demonstrated that outbreaks of diarrhea and dysentery among troops seriously degrade combat readiness. The development of vaccines to protect against dysentery as well as better methods of treatment depends on a better understanding of the bacteria responsible for the disease.

Bacteria of the genus *Chlamydia* are responsible for a wide range of diseases in man. *Chlamydia trachomatis* is the number one bacterial cause of sexually transmitted disease in the United States. It is also the major cause of preventable blindness in developing countries. Other bacteria of the genus *Chlamydia* are responsible for diseases including pneumonia and ocular disease in neonates and adults. *Chlamydia pneumoniae* is suspected to be a cofactor in a variety of chronic diseases including atherosclerosis. A major barrier to understanding how *Chlamydia* can cause such a broad range of diseases is the absence of genetic tools for studying the organism. A major focus of Dr. Maurelli's research is to develop these tools so that the power of molecular genetics can be applied to understanding *Chlamydia* pathogenesis. The potential impact of such research is in better diagnostic tools and improved prevention and treatment methods.

II. Publications (and manuscripts in press) within last 24 months

1. 1. Day, Jr., W. A., and **A. T. Maurelli**. 2001. *Shigella flexneri* LuxS quorum-sensing system modulates *virB* expression but is not essential for virulence. Infect. Immun. 69:15-23.
2. Schuch, R., and **A. T. Maurelli**. 2001. Spa33, a cell surface-associated subunit of the Mxi-Spa type III secretory pathway of Shigella flexneri, regulates Ipa protein traffic. Infect. Immun. 69:2180-2189.
3. Fernandez, I. M., M. Silva, R. Schuch, W. A. Walker, A. M. Siber, **A. T. Maurelli,** and B. A. McCormick. 2001. Cadaverine prevents the escape of *Shigella flexneri* from the phagolysosome: A connection between bacterial dissemination and neutrophil transepithelial signaling. J. Infect. Dis. 184:743-753.
4. Day, Jr., W. A., R. E. Fernández, and **A. T. Maurelli.** 2001. Pathoadaptive mutations that enhance virulence: Genetic organization of the *cadA* regions of *Shigella* spp. Infect. Immun. 69:7471-7480.
5. Schuch, R., and **A. T. Maurelli.** 2001. MxiM and MxiJ, base elements of the Mxi-Spa type III secretion system of *Shigella,* interact with and stabilize the MxiD secretin in the cell envelope. J. Bacteriol. 183:6991-6198.

6. Kane, C.D., Schuch, R., Day, W.A., and **A.T. Maurelli.** 2002. MxiE regulates intracellular expression of factors secreted by the *Shigella flexneri* 2a type III secretion system. J. Bacteriol. 184:4409-4419.

RESEARCH AREAS AND INTERESTS

Eleanor S. Metcalf, Ph.D.
Professor / Department of Microbiology and Immunology

I. Description of projects, how areas impact public health, military medical relevance, key words

Overview: There are three major focus of research in the laboratory of Dr. Metcalf, the first being Typhoid Fever, the long range goal of this component of our research program is to understand the virulence mechanisms of *S. typhi* in the context of the host environment, with the overall objective of reducing the morbidity and mortality to enteric fevers such as typhoid. Recent studies show that more than 16.6 million people currently have typhoid fever world-wide and at east 600,000 of these individuals will die. The majority of typhoid fever cases occur in children ages 3-19, and mortality rates range from 5-12%, depending on the country. Moreover, many isolates of *Salmonella enterica* serovar Typhi *(S. typhi),* the etiologic agent of typhoid fever, have become resistant to multiple antibiotics, and resistance to first-line antibiotics is wide-spread in countries where typhoid fever is endemic. These factors underline the importance of and necessity to develop inexpensive and readily administered vaccines as one important control strategy for combating this disease. *S. typhi,* as well as other enteric bacterial infections, are and have been responsible for morbidity and mortality of troops stationed in countries with underdeveloped health and hygiene practices. The results of these studies will provide new information on the infectious processes of *S. typhi* and increase our knowledge about typhoid fever. In addition, these studies will increase our knowledge of *S. typhi* that could be important in the development of new *S. typhi* vaccines.

The second focus in the laboratory is Food Poisoning. the long range goal of these studies is to understand the role of T cells in *Salmonella typhimurium* pathogenesis. The objective of these studies is to analyze the contribution of $CD8^+$ CTLs in the host response to *Salmonella.* In the United States, *Salmonella spp.* cause an estimated 2-4 million cases of salmonellosis every year which results in approximately 500 deaths. These organisms are the principal etiologic agents of gastroenteritis and enteric fever. It as been estimated that salmonellosis costs up to $50 million per year in the U.S. as a result of medical costs and work absences. One resolution to this problem is vaccination. While one strategy for the generation of efficacious vaccines is to identify virulence factors on the bacterium, another approach to treatment is to understand the host response to this pathogen. If the role of cytotoxic T lymphocytes in the host response can be identified and the antigens that these T cell recognize can be characterized, we may be able to manipulate the outcome of exposure to these pathogens. Our current studies address the role of cytotoxic T cells in *Salmonella* Infections. *Salmonella typhimurium* as well as other enteric bacterial infections, are, and have been responsible for morbidity and mortality of troops stationed in countries with underdeveloped health and hygiene practices. The results of this proposal will provide new information on the infectious processes of *S. typhimurium* and increase our knowledge about the generation of protective immune responses and the pathogenesis of this organism. Perhaps more importantly it will provide data on *Salmonella* antigens that may be useful in the preparation of efficacious vaccines.

The third focus is Alcoholic Liver Disease (ALD), the long range goal of this research endeavor is to understand mechanisms of the host response that contribute to the pathophysiology of ALD and the inflammatory syndrome associated with alcohol-induced liver damage. ALD is a significant problem in the United States. Over 50% of adults consume alcoholic beverages on a

regular basis. Of these individuals, at least 14 million people either depend on or abuse alcohol. Studies show that alcoholism accounts for greater than 120,000 deaths annually, and in 1998, the economic burden of alcohol-related issues was greater than 184.6 billion dollars. This cost is approximately 12% of the GNP and represents an expenditure of approximately $638 dollars for every man, woman, and child in the U.S. ALD is a significant problem in the U.S. and in the Uniformed Services. Over 50% of the adults consume alcoholic beverages on a regular basis, and of these individuals, at least 15 million people either depend on or abuse alcohol. Studies show that alcoholism accounts for greater than 100,000 deaths annually, and that the economic burden of alcohol-related issues reaches $100 billion dollars/year. Recent evidence indicates that military and civilian populations have similar incidences of alcohol abuse. Since studies also show that the rate of alcohol abuse for both men and women within the military is similar, alcohol-related health problems are clearly a significant problem for the Uniformed Services. To date, treatment regimens have been generally ineffective, in part, due to a lack of understanding of the mechanisms that underlie ALD. Since interventions that focus on early steps in the development of ALD would be the most desirable, our studies of the effects of alcohol on the initial cell types involved in this complex set of reactions should provide crucial data applicable to the development of successful interventions.

II. Publications (and manuscripts in press) within last 24 months

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6. Schmitt, C.K., J.S. Ikeda, S.C. Darnell, P.R. Watson, J.Bispham, T.S. Wallis, D.L. Weinstein, E.S. Metcalf, and A.D. O'Brien. 2001. Absence of All Components of the Flagella Export and Synthesis Machinery Differentially Alters Virulence of Salmonella enterica ser.Typhimurium in Models of Typhoid Fever, Survival in Macrophages, Tissue Culture Invasiveness, and Calf Enterocholitis. 60:5619-5625.

ARMED FORCES RADIOBIOLOGY RESEARCH INSTITUTE
Publications Summary
1999-2002

Journal Supplements

2002

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2001

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